# PUBLIC PERCEPTIONS OF RADIOACTIVELY CONTAMINATED SITE CLEANUP: FINDINGS FROM AN INTEREST AND ATTITUDES SURVEY AT DOE'S ST. LOUIS FUSRAP SITE

by

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AEC | U. S. Atomic Energy Commission |
| ARAR | Applicable or Relevant and Appropriate Requirement |
| BRA | Baseline Risk Assessment |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act of 1980 ("Superfund") |
| DNR | Department of Natural Resources |
| DOE | Department of Energy |
| FS/EIS | Feasibility Study/Environmental Impact Statement |
| FUSRAP | Formerly Utilized Sites Remedial Action Program |
| HISS | Hazelwood Interim Storage Site |
| MED | Manhattan Engineer District |
| MREM/pCi | Millirems/picocuries |
| NEPA | National Environmental Policy Act |
| SLAPS | Saint Louis Airport Site |
| SLDS | Saint Louis Downtown Site |

## FINDINGS

Over 200 respondents participated in the survey. Survey recipients living in the targeted census tracts adjacent to the St. Louis Airport Site (SLAPS) were far more responsive to the survey than were those living in the census tracts proximal to the St. Louis Downtown Site (SLDS). Thus, the survey findings are more reflective of the concerns and issues of the communities adjacent to St. Louis Lambert Airport than of the downtown community. Despite limited response by locale, the respondents were a diverse group in regards to level of education, employment status (e.g., employment outside the home, retired), and occupation (e.g., professional, technical, unskilled labor). Because the survey was mailed to heads of households, however, more men than women responded to it. Moreover, respondents are, on average, slightly better educated than the average area resident, and a large proportion of respondents were retired. Major findings are as follows:

- **Three-quarters of respondents report that they have never participated in FUSRAP-related activities.** Of the 16% who indicated some form of participation (about 5% failed to answer), the most popular form of involvement (nearly 40%) was attending public meetings. There is no significant association between participating in FUSRAP activities and gender, education level, employment status, or residential proximity to a site.

- **Treatment of contaminated soil and excavation with offsite disposal were the two most highly regarded potential cleanup alternatives.** Conversely, onsite management alternatives (e.g., excavation with onsite disposal, consolidating and capping the site) are viewed unfavorably. Among onsite remedies, only institutional controls that leave the site undisturbed and do not require additional excavation of material, is viewed favorably.

- **Cost of cleanup appears to influence cleanup option preferences.** Concern over the cost of cleanup was significantly related to the low ratings given to the two most expensive remediation options (treatment and offsite disposal), and to the high ratings given to the least expensive remediation option (institutional controls).

- **No cleanup option was viewed as a panacea.** Respondents were concerned with cleanup cost; safe, dependable removal of contaminants; and site safety after any remedy is applied. Desired characteristics of cleanup options are that they protect future generations, make the responsible party pay, encompass unanticipated problems, and not have to be repeated.

- **Ground- and surface water contamination, desire for public involvement, and potential health risks were the most highly-ranked site concerns.** While generally not concerned with community image, there is a strong relationship between residential proximity to one FUSRAP site (SLAPS) and concern over its impact on property values.

- **Additional areas of concern cited by respondents include the impact of the sites on future generations, the need for greater public education about FUSRAP, a desire for better assessment of risks to health and the environment, and avoiding generation of additional contaminated material.** On the whole, general public preferences and concerns were moderate, consistent with recent studies of contaminated sites that suggest that the public wants to be consulted on cleanup remedies.

- **Approximately three-quarters of the respondents are interested in participating in some type of activity to learn more about the St. Louis FUSRAP site.** Of the 77% who indicated such an interest, the most requested means to obtain information was through less interactive measures such as reading a newsletter.

## REPORT STRUCTURE

Chapter 1 discusses the methodology for the public opinion survey. Chapter 2 summarizes the findings of the survey by participation, remedy issues, site concerns, and interest in public involvement. Chapter 3 provides conclusions and recommendations and briefly discusses the content of a larger research report from which this public attitudes report is derived. That report describes and illustrates ways to accurately and transparently portray the actual risks to health and the environment from the radiological contamination at the St. Louis FUSRAP site. Methodologies used in that report include incorporating an uncertainty analysis into a radiological assessment and graphically depicting radionuclide concentration distributions.

# PUBLIC PERCEPTIONS OF RADIOACTIVELY CONTAMINATED SITE CLEANUP: FINDINGS FROM AN INTEREST AND ATTITUDES SURVEY AT DOE'S ST. LOUIS FUSRAP SITE

## 1. INTRODUCTION

This report contains findings of a public attitudes survey of the Formerly Utilized Sites Remedial Action Program (FUSRAP) in St. Louis, Missouri. The survey's purpose was to ascertain levels of actual and desired public involvement in remediation; gather views on public health and safety, as well as environmental, economic, and future land use concerns; and solicit cleanup remedy preferences among members of the public.

Survey results may help define and clarify preferences and concerns of the affected community and identify the degree to which perceptual barriers affect them. This can benefit FUSRAP's community-relations efforts which are intended, in part, to address these concerns and resolve public misconceptions about cleanup remedies and related issues. The survey, and the result of an uncertainty assessment undertaken by University of Tennessee researchers, (Feldman, et. el., 1995) may also help elucidate efforts needed to reduce the disparity between perceived and actual site risks so that the public may more objectively assess any proposed cleanup remedy.

### 1.1 Background

FUSRAP sites comprise a diverse array of government- or privately-owned sites in the continental United States that were used by two of the Department of Energy (DOE) predecessors (the Manhattan Engineer District (MED) from 1942 to 1946 and the U. S. Atomic Energy Commission (AEC) from 1946 to 1973) for processing uranium and thorium ores and storage of radiological concentrates and residues. At one time nearly 400 facilities nationwide were engaged in these activities, which were initially aimed at providing feed materials to other sites responsible for developing nuclear weapons. Activities at these sites contaminated equipment, buildings, and soils with naturally occurring radionuclides (Uranium-238 and Thorium-232) and by-products of their decay (radon and thoron). As a result of health and environmental concerns, Congress initiated FUSRAP in 1974 to decontaminate and restore these sites to a condition suitable for human use. FUSRAP now encompasses 45 sites in 14 states.

The St. Louis FUSRAP site consists of the St. Louis Airport Site (SLAPS), the St. Louis Downtown Site (SLDS), the Latty Avenue properties (including the Hazelwood Interim Storage Site or HISS) and various vicinity properties and transportation routes. From 1942 to 1957, the Mallinckrodt Chemical Company in downtown St. Louis processed uranium ore under contract with the MED/AEC. During that time, radioactive residues from processing contaminated the property and were released into the environment. In 1946, the MED acquired SLAPS and began storing Mallinckrodt residues. Some of the material was buried; however, most was stored in

bulk form, uncovered, resulting in the contamination of six vicinity properties. At the end of MED/AEC's contract with Mallinckrodt in 1957, AEC decontaminated buildings at the downtown site and released them for use without restrictions. Although the area had been cleaned to standards in effect at the time, current radiation levels at Mallinckrodt exceed more stringent current guidelines.

In the late 1960s most of the residues at SLAPS were sold to a private entrepreneur who hoped to recover precious minerals contained in them. The residues were were moved to a storage site on Latty Avenue, a portion of which later became the HISS. In the process of moving the material, spillage contaminated roadside ditches and nearby properties along transportation routes. Clean up of the residential properties located along these routes was initiated and completed in 1994. In 1995, the contaminated soil was sent to Envirocare of Utah for disposal.

Most of the material sent to Latty Avenue was later shipped offsite and in 1977, the Latty Avenue properties were released and sold. However, when the present owner requested a radiological characterization, contamination exceeding current limits were found. Additional contamination was discovered in 1981 and in 1984 decontamination began. 27,000 $yd^3$ of material was moved to the HISS. In 1987, the HISS pile was covered and remediation efforts at the Latty Avenue properties were conducted. However, contamination exceeding current DOE standards still exists and will require remedial action.

SLAPS remediation has proceeded more slowly. In 1973, DOE razed onsite structures at SLAPS, buried their remains, and covered them with 1 - 3 feet of clean fill. At this time, surface radiation levels were within acceptable guidelines. In 1985, DOE acquired SLAPS as a permanent disposal site. The site has been monitored since 1986 which has included multiple radiological characterizations to determine the whereabouts and extent of contamination.

In a non-binding referendum held in St. Louis County in 1991, more than 80 percent of voters opposed the establishment of a permanent waste disposal site in the county (Harrison, 1991). In early 1994, the DOE disclosed a Proposed Plan for the St. Louis sites recommending SLAPS become a permanent storage facility where all materials from SLAPS, HISS and SLDS be consolidated. Two options for disposal have been introduced: (1) adding material to the SLAPS pile and capping it; or, (2) excavating SLAPS material and constructing a bunker onsite to contain all the material. Both options have been met with strident opposition from residents and local and state officials (Goldgaber, 1994). The Missouri Department of Natural Resources (DNR) attacked the plan, stating that the proposed bunker did not meet safety and environmental requirements ("Reynolds Meets," 1994; "Reynolds Concerned," 1994).

In 1994 the DOE stated that any remedy adopted for the St. Louis FUSRAP site must be publicly acceptable and economically and technically feasible. This concession does not exclude the possibility of some type of onsite disposal of contaminated soil. However, according to the DOE Assistant Secretary for Environmental Management Thomas Grumbly, "everything is on the table, and we will work with all of our stakeholders (to develop a) new strategy." Thus DOE is

committed to incorporating citizen input in the process of remedy selection (U.S. DOE, 1994a; Kaemmerer, 1994b; Weapons Complex Monitor, 1994).

To incorporate such input, a better understanding of public attitudes toward risk, hazard, and preferred remedy is required. Understanding these attitudes can help to determine if additional public education or improved risk communication can positively affect public perceptions and enhance public trust toward cleanup. Moreover, to ensure acceptability, decision makers must know the public's concerns about the contaminated site and its views on possible cleanup remedies. They also need to know what roles, if any, the public wants in remedy selection. To ensure feasibility, decision makers require guidance on how to select remedies that encompass the most likely threats to public health, safety, and the environment.

There are many barriers to *public acceptance* and *technical and administrative feasibility* confronting efforts to remediate FUSRAP sites. The former include distrust of DOE's ability to vigorously implement cleanup remedies, fears that property values may decline as a result of poor or untimely cleanup, and future site use. The latter include such issues as cost-effectiveness, achievability of remedy, and impact.

### 1.2 Survey Methodology

The survey process was comprised of three parts: selection of the population sample, survey design and implementation, and data analysis. Identifying the potentially affected population for the St. Louis FUSRAP site was, by far, the most difficult part of the survey. There is no clear consensus among policy analysts over what constitutes an "affected area" in hazardous and radioactive waste site cleanup issues.

The area encompassed by the survey was limited by the likely range of impacts from the St. Louis FUSRAP site and the geographic scope of public concerns. These impacts and concerns were identified in two ways. First, we drew upon a DOE contractor-prepared Baseline Risk Assessment (BRA) and a Feasibility Study/Environmental Impact Statement (FS/EIS) for the St. Louis FUSRAP site that depict areas thought to be subject to possible air- and waterborne exposure from contaminants. They also elucidate specific economic infrastructure and urban populations most likely to be affected by cleanup remedies (U.S. DOE, 1992; U.S. DOE, 1994b). These affected areas encompass 15 U.S. census bureau tracts.

Second, we drew upon other studies of public attitudes toward contaminated site cleanups that define affected areas by political jurisdiction (e.g., a single county, several counties within a state, Standard Metropolitan Statistical Area boundaries). This is done to bound areas according to local authority for certain cleanup issues (e.g., future land use), and to delimit the geographic scope of public interest (Kowalewski and Porter, 1993; Adeola, 1994; Bailey, Faupel, Holland, 1992; Dantico, Mushkatel, Pijawka, 1992; Fischer, 1993; Rabe, 1993; Slovic, 1991; Greenberg and Schneider, 1994).

As in these previous studies, we excluded more distant communities for two reasons. First, while waterborne contaminants may be carried by the Mississippi River away from the St. Louis Site prior to cleanup, affecting downstream populations, studies of this problem adduce that these impacts are likely to be negligible (U.S. DOE, 1992). Second, interest expressed by these downstream populations has been negligible, and their probable level of knowledge of the St. Louis site is likely to be low.

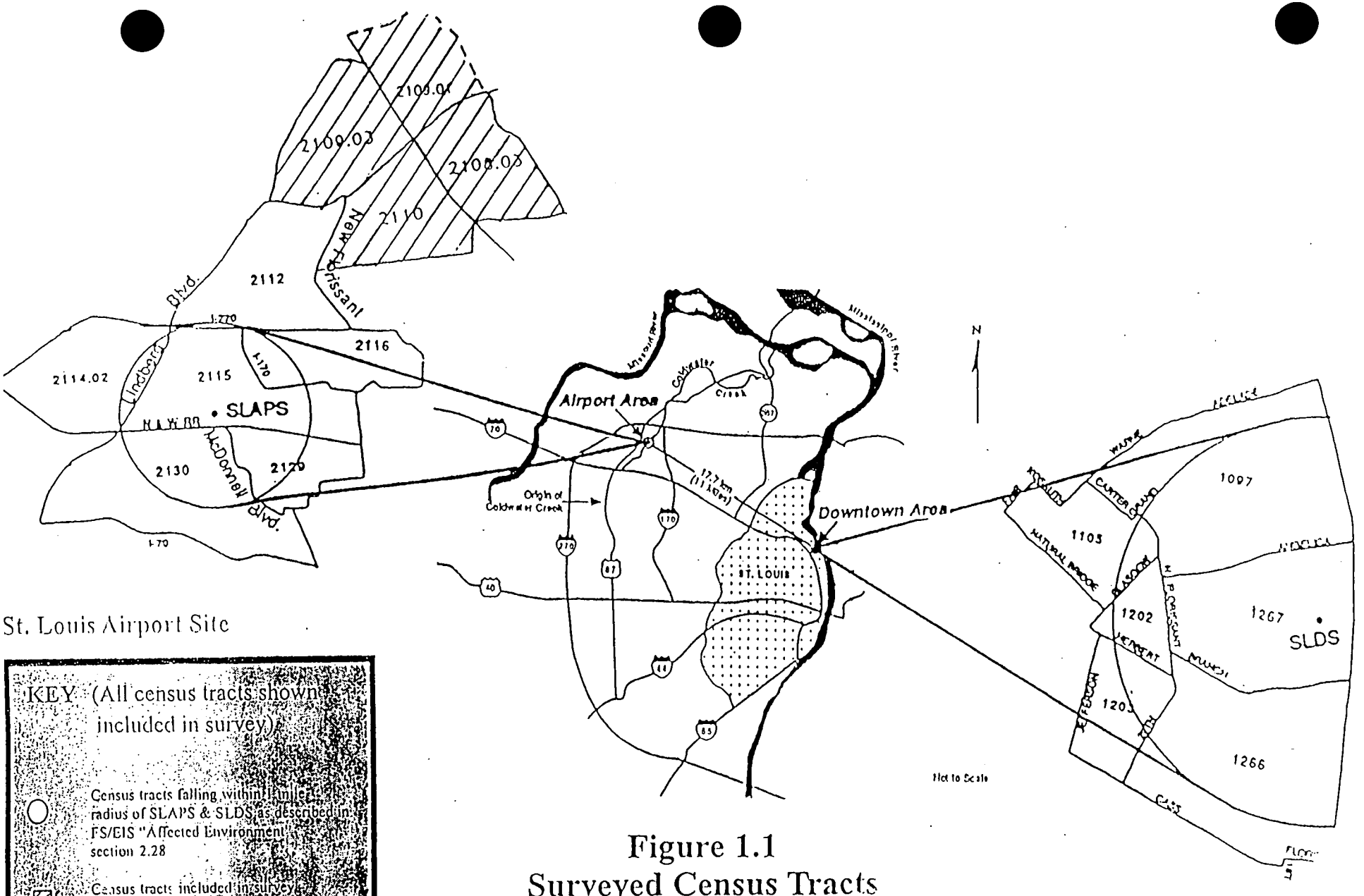
In contrast to many of these studies, however, we delimited our study area to affected census tracts and population districts *within* St. Louis City/County (Figure 1.1). Since census tracts *are* demarcated by political or geographic boundaries, selection of these tracts made for an effective compromise between political jurisdiction and geographic impact. Information on these tracts, including detailed street maps, was obtained from the St. Louis East-West Gateway Coordinating Council. Sample size was structured to provide a 95% confidence level and the sample was developed through random-generation of names on identified streets within each census tract.

The survey protocol (see Appendix A) was designed to solicit information about previous as well as desired future participation in St. Louis FUSRAP site activities, gather opinions about proposed or contemplated cleanup alternatives, and gauge perceptions of the importance of oft-cited issues typically associated with radionuclide-contaminated sites (e.g., health and environmental risks, remediation costs, community image, impact of the contaminated site on property values).

A pre-implementation evaluation of the survey was conducted with the assistance of Bechtel community relations staff familiar with the St. Louis site. In addition to suggestions about question wording and current information to be included in the survey, Bechtel staff provided the names of people who have attended public hearings, requested additional information about the St. Louis site, or otherwise expressed an interest in FUSRAP cleanup issues. From this list of names, a stratified sample was drawn up of 50 area residents. The survey was sent to each of these residents to evaluate question transparency. 32% of the sample responded and from an analysis of these surveys, the questions were determined to meet design objectives.

Survey administration included an initial mail-out of 1000 surveys and a follow-up mail-out to those who did not respond to the first mailing. To maximize response rate, nonresponders were telephoned. The phone call served to prompt those individuals who preferred to mail in the survey, but had not yet done so, and to provide an option of answering the survey over the phone.

The survey responses analyzed and presented in section 2 include both the responses from the pre-implementation evaluation group (sample size = 50) and survey mail-out/telephone group (sample size = 1000). Survey responses were analyzed using two statistical packages: Excel (TM), and Statistical Package for the Social Sciences. These packages made possible the analysis of nominal and interval data by means, standard deviations, frequency distributions, and pie charts and cross-tabulation of findings with demographic information and other issues.




St. Louis Airport Site

KEY (All census tracts shown included in survey)

Census tracts falling within 1 mile radius of SLAPS & SLDS as described in FS/EIS "Affected Environment" section 2.28

Census tracts included in survey population because of their proximity to Coldwater Creek (Census Tract 2190 included in part)

St. Louis Downtown Site

# Figure 1.1
# Surveyed Census Tracts in St. Louis

Maps adapted from *FS/EIS for the St. Louis FUSRAP Site* (U.S. DOE, 1994b).

## 2. SURVEY FINDINGS

Survey questions focused on: (1) the types of activities related to site cleanup that respondents have previously participated in (e.g., attended public hearings); (2) activities they would be interested in participating in if available; (3) their opinions about cleanup technologies under consideration at the sites; and (4) their opinions on possible cleanup issues (e.g., health, environmental quality, future land use, transportation, and public involvement. For topics (3) and (4), a "Likert"-type scale ranging from "1" (low support) to "5" (strong support) was employed. Using such a scale, respondents may rate equally more than one issue (e.g., give each cleanup issue a rating of "5"-- strongly support). This type of question is, thus, different from one which employs *ranking* among choices. A copy of the survey is provided in Appendix A. Appendix B contains a list of written comments to questions by respondents, and Appendix C depicts statistically significant relationships among survey findings.

### 2.1 Sample Composition

Over 200 respondents participated in the survey. Survey recipients living in the nine targeted census tracts proximal to SLAPS were far more responsive to the survey (23% of that portion of the sample responded) than were those living in the six targeted census tracts proximal to SLDS (only 10% sample response rate). Thus, the respondent sample's composition is, in general, more reflective of the communities adjacent to St. Louis Lambert Airport than of the downtown community (Figure 1.1).

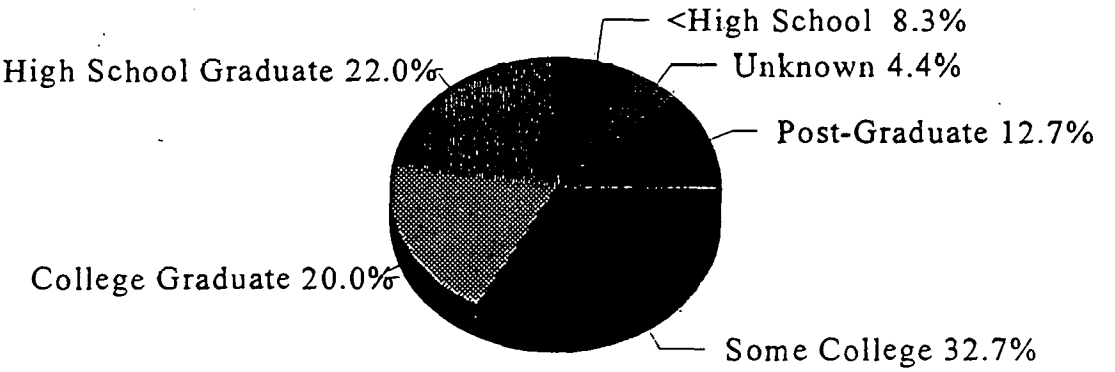
Despite limited response by locale, members of the sample differed along a number of important dimensions. In regards to education, the respondents were slightly better educated than the average area resident (East-West Gateway Coordinating Council, 1993). About 8.3% had less than a high school education, 22.0% were high school graduates, 32.7% had some college, 20.0% graduated from college, and 12.7% were post-college graduates (Figure 2.1A).

Relative to employment experience, 54.6% are currently employed outside the home while 32.2% are retired (Figure 2.1B). There are nearly twice as many men than women in the sample, probably due to the fact that surveys were mailed to--and likely filled out by--heads of households (Figure 2.1C). Finally, less than half the respondents have children under 18 living at home (Figure 2.1D).

### 2.2 Previous Participation

The vast majority of respondents (78.5%) have not participated in any FUSRAP-related activities (e.g., attended public meetings or workshops, visited the DOE-information center, or contacted DOE or elected public officials) (Figure 2.2A). Reasons for non-participation, as gauged by respondent comments, include lack of knowledge about FUSRAP, lack of concern over it and more important priorities (Appendix B). 5.4% of the respondents did not identify whether they have participated in FUSRAP activities.

A. Education Level




B. Employment Status

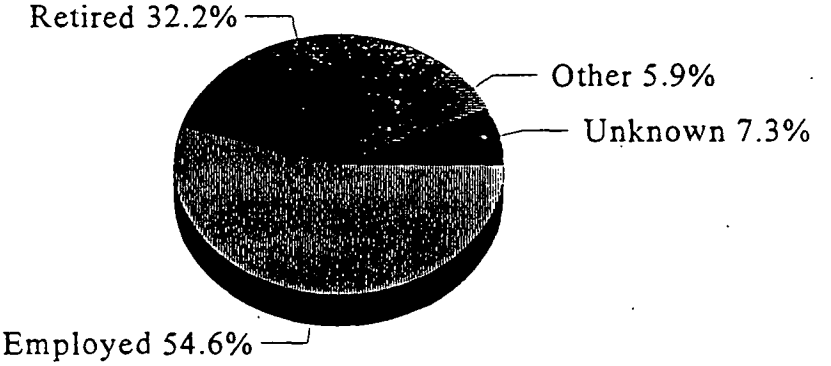
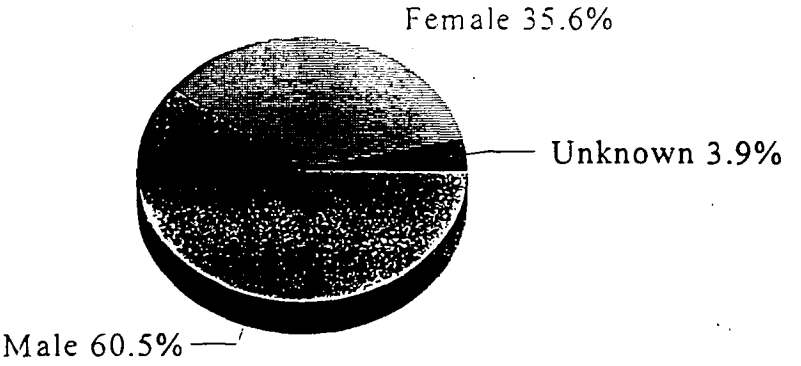
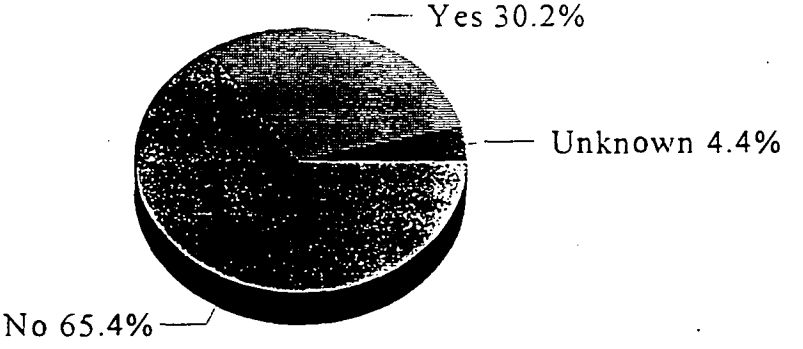



**Figure 2.1 Survey Respondents' Demographic Characteristics**

C. Gender

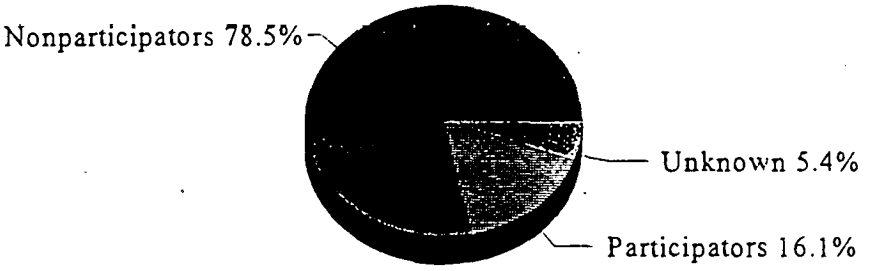



D. Households with Children




**2.1 Survey Respondents' Demographic Characteristics, Continued**

A. Participators versus Nonparticipators




B. Participators: Types of Activities

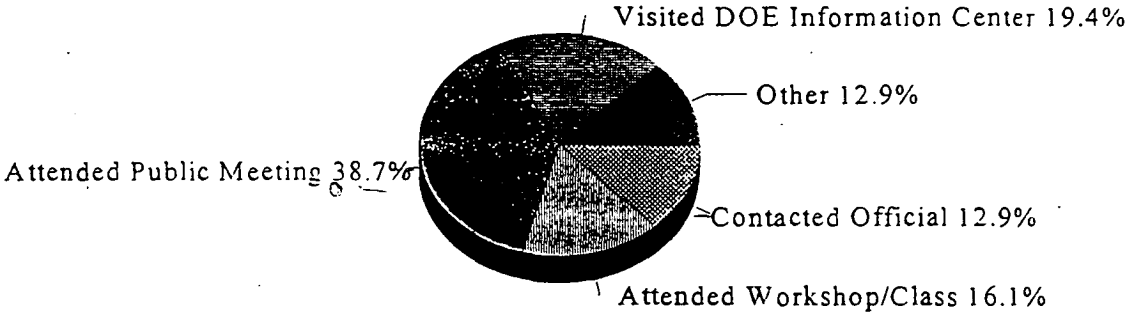



**Figure 2.2 Previous Participation in FUSRAP-Related Activities**

Previous participation was associated with one concern: cost of cleanup. Those respondents who have previously been involved in a FUSRAP-related activity are less concerned with the cost of site remediation (Appendix C). This is consistent with the finding that those who have previously participated in FUSRAP activities are more supportive of the most expensive cleanup option, treatment (Appendix C).

There was no observed relationship between FUSRAP participation and residential proximity to one or both FUSRAP sites. Those who lived closer (e.g., within 2 miles of a site) did not appear to have a greater inclination to participate than those living more than 2 miles from a site. There is a caveat to consider in this finding: the survey sample was limited to a maximum distance of 6 miles from SLAPS and SLDS. Thus, no attempt was made to test relationships between participation and residence outside this zone.

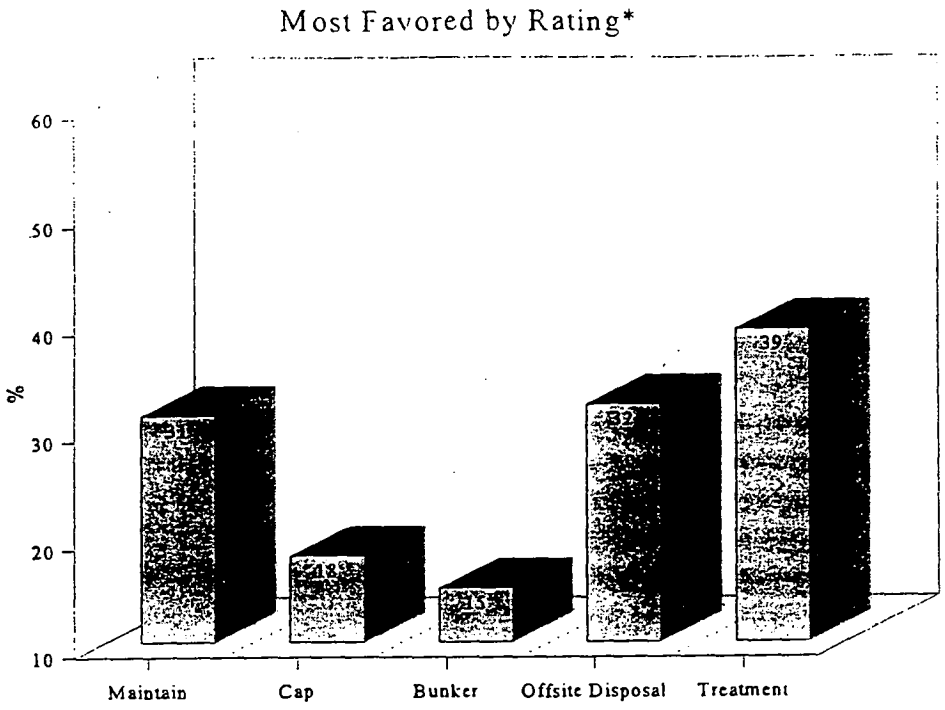
There was also no significant association between participation and gender, education level, employment status, or whether children currently reside in the household. None of these demographic factors can predict public meeting attendance, for example. Not surprisingly, we did find a significant relationship between past involvement in FUSRAP activities and level of familiarity. Those who had previously participated in activities were more familiar with the site (Appendix C).

Of the 16.1% of respondents claiming to have participated in FUSRAP activities, the most popular form of participation was "attending a public meeting," engaged in by 38.7% of these respondents (Figure 2.2B). This was followed by "visited the DOE information center" (19.4%), "attending a workshop or class" (16.1%), and "contacting an elected and/or DOE or contractor official" (12.9%). "Other" activities were engaged in by 12.9% of respondents and included such actions as visiting the Latty Avenue storage site and speaking at a public meeting.

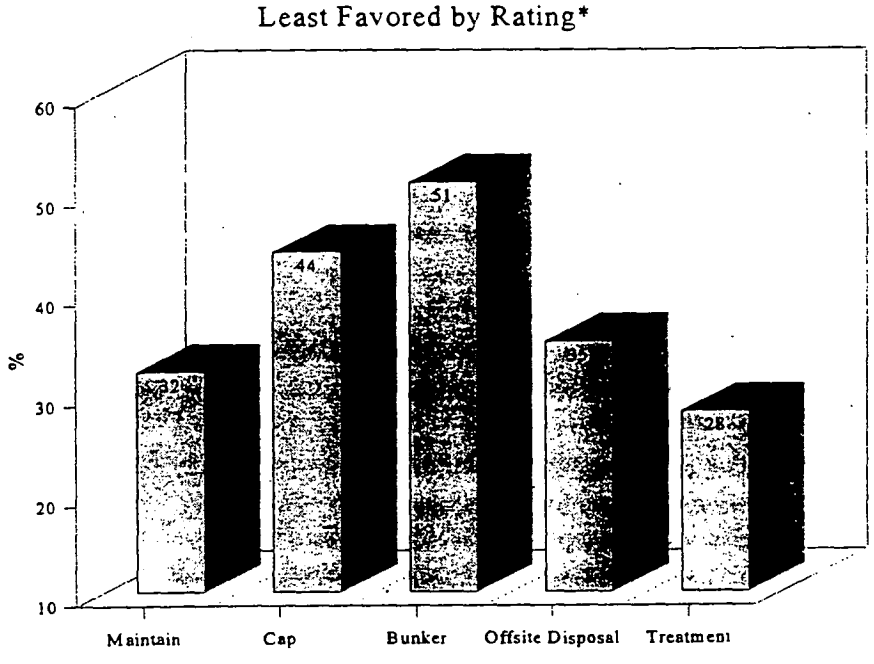
## 2.3 Cleanup Remedy Preferences

Respondents were asked to rate their preferences toward five major sets of cleanup alternatives for the St. Louis site, taken from DOE's FS/EIS for the St. Louis site: institutional controls and maintenance of the site; consolidating contaminated soil at one site (SLAPS) and capping it with a cover; excavation of contaminated soils coupled with onsite disposal in an above ground bunker at SLAPS; excavation coupled with offsite disposal (i.e., outside of St. Louis county); and treatment of contaminated soils. Overall results are depicted in Figure 2.3.

Until 1994, when DOE's Assistant Secretary for Environmental Management placed a moratorium on the proposed plan, SLAPS was intended to be the final disposal site for all St Louis FUSRAP contaminated material. A consolidated storage pile was to have been built at SLAPS, covered with a clay cap (a solution termed "consolidation and capping"), and monitored "in perpetuity" (Uhlenbrock 1994a, b; Kaemmerer 1994a).




*Percent respondents choosing 4s or 5s on a 1-5 rating scale




*Percent respondents choosing 1s or 2s on a 1-5 rating scale

**Figure 2.3 Cleanup Alternatives**

Respondents were provided with brief descriptions of each of these remedies and were told that all have been studied for possible use. The survey made clear that while each of these alternatives had been studied, none had been selected. Respondents were also provided with an estimate of each remedy's costs. The latter were provided in order to gauge if cost of cleanup would be a factor in public preference, as has been hypothesized by some experts (Greenberg and Schneider, 1994; Bailey, et. al., 1992). The survey also allowed comparisons to be made both within alternatives (average preference and frequency distribution of responses) and *between* them (highest and lowest ranked preference).

Various community groups and local governments have gone on record against one or more of these potential cleanup alternatives. Moreover, attempts have been made to broadly gauge public preferences. In 1989, a select committee of area officials was appointed by the St. Louis County Municipal League to study plans to build a permanent bunker for contaminated soil at SLAPS. The committee recommended against onsite disposal and sponsored a voter referendum in November, 1990 (Goldgaber, 1994; Reynolds Concerned, 1994; Borgshulte, 1994). City and County voters voted overwhelmingly against (80 and 85%, respectively) a permanent SLAPS disposal site.

Among respondents to the survey, those alternatives under study by DOE which are designed to provide an onsite management remedy at the St. Louis site (e.g., excavation followed by onsite disposal, consolidating and capping of contaminated material) were generally viewed unfavorably (Figure 2.3). The notable exception to this trend is the option of institutional control and maintaining the site, which is viewed favorably relative to other onsite alternatives. This option leaves the site undisturbed and does not involve additional excavation or hauling of contaminated material. Table 2.1 shows the overall rank order of remedies based on the average scores of respondents' ratings (1-5 scale).

Treatment and excavation in conjunction with offsite disposal are the most highly-regarded remedies by survey respondents. These options received the greatest number of positive ratings and were among the options having the fewest negative ratings (Figure 2.3). In contrast, excavation followed by onsite disposal (in an above ground bunker) was, by far, the least favored alternative, garnering the fewest high ratings and the greatest number of low ratings.

The range of scores between the highest regarded option (treatment) and lowest regarded option (onsite disposal) is relatively modest (3.2 - 2.1). This relatively modest range may be explained by the fact that each of these potential remedies is viewed as having serious problems. Respondents report that their primary concerns, regardless of remedy selected, are the cost of site cleanup, assurance of site safety after a remedy is applied, and dependable, safe disposal of wastes and residues. Fully one-third of respondents who provided written comments alluded to the cost of cleanup as their major concern. One-sixth of respondents with comments reported that they want contaminated material removed from St. Louis (Appendix B).

Cleanup alternative rating results were cross-tabulated against other data derived from the survey to determine if there were any statistically significant relationships among survey findings. A number of discernable relationships were found between remediation options and cleanup issues (e.g., health risks and cost of cleanup). These relationships are described in sections 2.3.1 through 2.3.5. Remediation option responses were cross-tabulated against respondent demographic characteristics including education level, employment status, gender, and whether children currently reside in the home. The only characteristic that appeared to significantly affect a remediation option rating was the level of education on consolidation and capping (see section 2.3.4). Other potentially significant relationships tested included those between each of the cleanup options and respondent distance from SLAPS and SLDS, past participation in FUSRAP-related activities, prior familiarity with the St. Louis FUSRAP site, and length of residence. Of these relationships, there were only two statistical significant associations, both of which involved the cleanup option of treatment and past participation in FUSRAP activities and distance respondents reside from SLAPS (see section 2.3.1).

**Table 2.1 Ranking of Proposed Cleanup Ratings**

| *Alternative* | *Average score (1-5 scale)* | *Level of favorability** | *Associated or most frequently cited comments* |
|---|---|---|---|
| Treatment of contaminated soil | 3.2 | Moderate | Concern with cost-effectiveness; risks of residue/incineration noted. |
| Excavate w/offsite disposal. | 3.0 | Moderate | Concerns with transferring the problem, rather than resolving it, and offsite transportation risks, including risks to those in corridor communities. |
| Institutional controls/ maintain site | 2.9 | Low | Preference associated with offsite transport concern, perception that sites have no ill-effects; critics cite concerns over viability, costs v. benefits. |
| Consolidate and cap | 2.3 | Very low | Concern over impact on future land use; advantage unclear. |
| Excavate w/onsite disposal in an above ground bunker | 2.1 | Very low | Concerns over water contamination, leaving contaminated material in populated area. |

*'Very high' means a rating of 4-5 about 60% of the time, 'moderately high' means a rating of 4-5 around half the time; 'moderate' means a 4-5 rating less than half the time, 'low' means a 4-5 rating less than one-third of the time, and 'very low' means a rating of 4-5 less than one-fourth of the time.

### 2.3.1 Treating Contaminated Soil

In addition to having the highest overall score (3.2), treatment had the highest percentage of favorable ratings (39% 4s and 5s) and the lowest percentage of negative ones (28% 1s and 2s) (Figure 2.3). This high rating was apparent despite the fact that treatment was presented to

respondents as the most costly cleanup remedy (estimated cost $1.3 billion; current studies suggest that this may no longer be true). However, cost may have influenced those respondents who gave treatment low ratings since, among those respondents who reported that cost was a major concern, treatment ranked low (Appendix C).

Factors that may contribute to the overall strong support for treatment are proximity to SLAPS, previous participation in FUSRAP-related activities, and community image. Treatment is highly favored by those who reside in close proximity to SLAPS (Appendix C). This is probably because of opposition to onsite disposal or concern over the possibility of nearby "spills" of contaminants from offsite transport of soils. Among those respondents who have previously participated in FUSRAP-related activities, treatment is also a preferred remediation option (Appendix C). Information provided to respondents as a part of these activities may have partially influenced their favorable views on this alternative. In addition, treatment tends to be favored by those who are more concerned with "community image." Respondents may perceive this cleanup option as an effective means of removing contaminated materials and associated community stigma (Appendix C). However, given that few appear concerned with community image, this factor probably has a limited influence on this option's high ratings.

Although treatment is the most preferred potential remediation option, respondent comments serve as a reminder that even the most favored alternative is viewed as having drawbacks. Criticisms include treatment's cost, alleged lack of cost-effectiveness, and potential negative impacts (e.g., concern over what to do with wash water from soil washing and how to reuse contaminated residue). Even positive comments about treatment acknowledge a concern over, for example, the potential for reuse of cleaned soils and whether this option is actually viable (Appendix B).

### 2.3.2 Excavation With Offsite Disposal

Except for treatment, excavation followed by offsite disposal is the most popular potential alternative for managing the cleanup of the St. Louis FUSRAP site (score = 3.0). 32% of respondents gave it a 4 or 5 rating. Interestingly, a slightly larger proportion of respondents (35%) gave it a rating of 1 or 2 (Figure 2.3). Among the strongest supporters of excavation and offsite disposal are those respondents who identify themselves as less likely to be concerned with cleanup costs (Appendix C). This makes sense insofar as this alternative is the second most expensive cleanup option (estimated cost between $580 million and $920 million depending on whether the disposal facility is located in- or out-of-state).

Respondents who support offsite disposal as a cleanup option are more concerned with health risk to community members and water contamination (Appendix C). Since this option is designed to remove contaminants, they probably view this alternative as eliminating the source of potential exposure and water contamination. In addition, those who favor this cleanup option are more concerned with future land use restrictions (Appendix C). This finding is not surprising since the removal of onsite contamination would presumably allow for increased future land use

options. It is also understandable that those who support this remediation option are more concerned with community image since this option would likely be perceived as eliminating the stigma associated with retaining the contaminants onsite (Appendix C).

The slightly higher percentage of low marks excavation and offsite disposal received may partially be explained by respondent comments. Those opposed to this option gave as their reasons its "enormous cost," as well as the perception that it may "create more problems than it solves" (Appendix B). The relatively higher ranking for treatment may, in part, be due to the perception that it creates fewer new problems (e.g., no need for offsite transport). Despite such criticisms, excavation and offsite disposal is clearly more favored than onsite management alternatives.

### 2.3.3 Institutional Controls and Site Maintenance

This alternative lies in the middle range of respondent preferences (average = 2.9). Approximately equal numbers of respondents give it low (32% 1s and 2s) and high (31% 4s and 5s) marks. Respondents who support institutional controls and maintaining the site are more concerned with the cost of cleanup; less in favor of transportation of contaminated soils; and more concerned with future land use restrictions (Appendix C). Each of these concerns are understandable given that this is the *least expensive* option that would *not* involve transportation of soils offsite, but *would* involve future land use restrictions (e.g., deed restrictions, access controls).

Written comments provide further insight into respondent views on this potential remediation option. Criticisms of institutional controls cite its relatively high cost given the option's apparent simplicity. Some question the viability of a perimeter fence for protecting the public, particularly children. Those in favor of this option, on the other hand, cited the absence of "perceived ill effects" from the St. Louis FUSRAP site. They also allude to the fact that contaminated soil has been at these sites a long time, with no apparent harm to the community (Appendix B).

### 2.3.4 Consolidation and Capping

This is the second lowest-rated potential cleanup alternative for the St. Louis site (average = 2.3), generating the second highest percentage of negative ratings (44% of respondents gave it a 1 or 2) and the second lowest percentage of very positive ones (only 18% gave it 4s or 5s). Demographically, support for this alternative seems to be most strongly associated with those having less formal education (high school, no college) (Appendix C).

Respondents who rate this option low appear to be concerned with how this cleanup alternative would limit future land use options (Appendix C). Their apprehension is likely based on the assumption that since consolidation and capping is intended to contain *rather than* eliminate onsite contamination, land use restrictions would be required.

Written comments pertaining to this remedy provide further insight into the lack of support for this alternative. Most respondent comments are highly critical of this alternative, characterizing it somewhat skeptically as a "shot-gun" approach that will serve no positive end (Appendix B). However, while most respondents oppose consolidation and capping, most are also unconcerned with stigma or adverse community perception (see section 2.4.5).

### 2.3.5 Excavation With Onsite Disposal

By far the least preferred option for cleanup of the St. Louis site (average score = 2.1), excavation followed by onsite disposal of contaminated soil garnered the greatest number of negative ratings (51% 1s and 2s) and the fewest positive ratings (15% 4s and 5s).

While there were very few comments on this alternative, those provided by respondents most frequently cited a concern for ground- and surface water contamination (a highly-ranked concern among respondents generally), the perceived inappropriateness of disposing contaminated material in a densely-populated area, and fear that onsite disposal may deny future use of a site or prevent returning a site to a "pristine" condition (Appendix B).

## 2.4 Cleanup Issue Concerns

Public perceptions of the risks associated with hazardous or radionuclide-contaminated sites are not only varied but, at times divergent from those risks experts believe are most important (U.S. EPA, 1990; Page and Rabinowitz, 1993). Previous research suggests that the public wants to be contacted early and often about the cleanup process, is concerned about how cleanup may disrupt normal economic activities, and wants to see waste material quickly and effectively stabilized (Hoopes and Glover, 1988; Schlatter, 1986; Kannard and Dravecky, 1987).

For the St. Louis FUSRAP site, anecdotal evidence suggests that local residents are opposed to adding contaminated material to the existing HISS, and want contaminated material removed from residential neighborhoods. (Eberlin, 1993; Ide, 1994).

As a result of these prior studies and anecdotal site evidence, nine commonly cited concerns were provided to respondents, ranging from risks to human health and environmental resources to the effect of site cleanup on local community image (e.g., 'stigma'), property values, future land use restrictions, transportation of contaminated soils, cleanup costs, and degree of desirable public involvement in site cleanup. Respondents were also encouraged to name another issue and rate it, if they wished. Table 2.2 depicts the overall ranking of concerns based on the average scores of respondents' ratings.

Gender appears to be significantly associated with rating on two concerns: health risks and the need for public involvement (Appendix C). Relative ratings of other issues is more reflective of the concerns of the total sample population, regardless of gender (Figure 2.4). Women respondents tend to be somewhat more concerned about environmental risks (59 to 49%).


*Percent respondents choosing 4s or 5s on a 1-5 rating scale

Figure 2.4 Most Favored Cleanup Concerns by Gender*

## Table 2.2 Ranking of Concern Ratings

| *Issue* | *Ave. score (1-5 scale)* | *Level of concern** | *Associated or most frequently cited issues* |
|---|---|---|---|
| Water contamination | 4.4 | Very high | Coldwater Creek, Missouri River cited; related to low rankings for onsite management remedies. |
| Health risks to community | 4.2 | Very high | Possible health concerns widespread; appears to be source of outrage and inequity for many. |
| Public involvement | 4.2 | Very high | Alternatives for involvement wide-ranging, specific. Comments ask for better information from experts. |
| Environmental risks | 3.9 | Moderately high | Few concrete examples cited. |
| Cleanup costs | 3.8 | Moderately high | Rated as primary concern among those opposed to treatment or offsite disposal. Fiscal restraint should not prevent protection of health. |
| Impact on local property values | 3.8 | Moderately high | Most comments contend impact is inconsequential; however, strong association between proximity to SLAPS and perceived impact. |
| Soil transport | 3.7 | Moderate | Opposed by those favoring institutional controls/ onsite management. Accident risks a concern. |
| Future land use restriction | 3.6 | Moderate | Many believe site-use restrictions already exist; many favor future restrictions. |
| Community image | 3.1 | Low | Little stigma; perception that area is already 'blighted.' |

*'Very high' means a rating of 4-5 about 60% of the time, 'moderately high' means a rating of 4-5 around half the time; 'moderate' means a 4-5 rating less than half the time, 'low' means a 4-5 rating less than one-third of the time, and 'very low' means a rating of 4-5 less than one-fourth of the time.

community image (38 to 29%), and property values (57 to 51%). By contrast, men are slightly more concerned with clean-up costs (51 to 48%).

In addition to gender, other demographic characteristics were cross-tabulated against ratings of concerns to identify additional significant associations. No statistically significant relationship was found between any concerns and level of education, work status, and whether children currently reside at home. Drawing upon the Haines Directory that lists number of years residents have had the same listed telephone number (which we used as an indication of length of residence), we attempted to determine if any concerns about the site were significantly related to how long a respondent has resided in the community. Again, no significant associations were observed.

Other factors that we tested included concerns and the distance respondents live from SLAPS and SLDS, past participation in FUSRAP-related activities, and prior familiarity with the St. Louis FUSRAP site. The distance respondents reside from SLAPS was significantly associated with only one concern: the impact of the FUSRAP site on property values (see section 2.4.6). Likewise, past participation in FUSRAP activities was only significantly associated with cleanup cost (see section 2.2). Level of familiarity with the FUSRAP site was not associated with any discernable relationships regarding respondent rating of concerns.

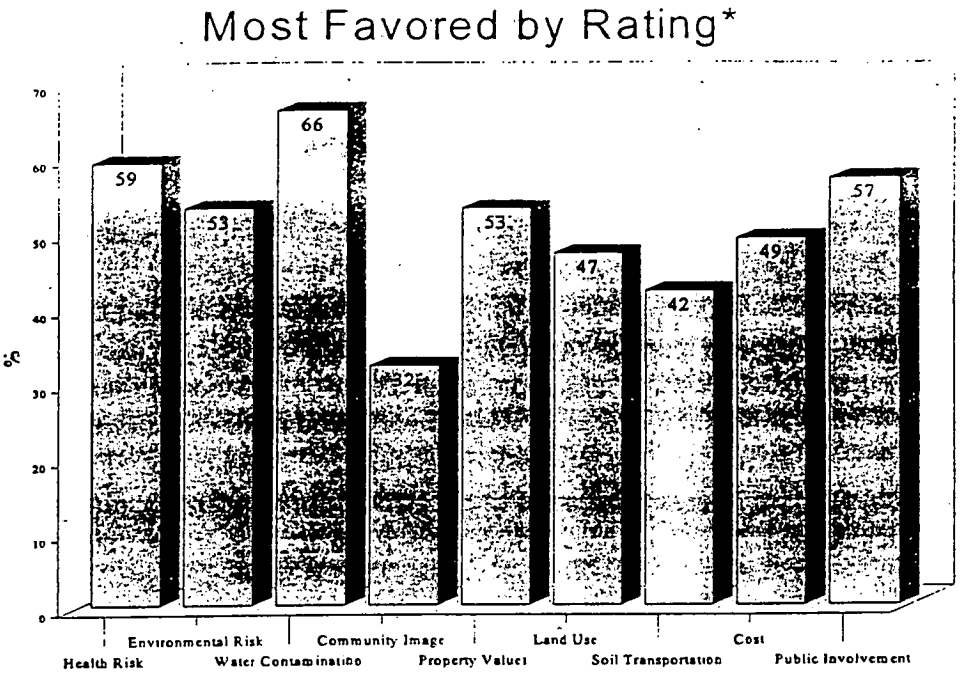
Overall, the most significant finding is that those concerns rated most important by respondents (4 or higher) are those directly related to public health, the environment, and public involvement. This is consistent with the findings of other recent studies that have focused upon public concerns surrounding the cleanup of contaminated sites (Bailey, et. al., 1992; Dunlap and Mertig, 1992; Adeola, 1994). The high rating given public involvement, moreover, appears to resonate with the findings of recent studies that contend that the public perceives many of the gravest threats to health and environmental well-being as attributable to a lack of political accountability, a need for direct citizen activism, and a high degree of distrust toward authorities perceived to be responsible for environmental hazards (Adeola, 1994; Freudenberg and Steinsapir, 1992).

By contrast, the least important issues to our sample of respondents seem to be those that are the least palpable (e.g., community image, future use of land). Respondent comments, as well as other issues frequently cited by respondents in addition to the nine issues provided, confirm this assessment. The most frequently cited additional areas of concern (cited fully half the time) were the impact of sites on future generations, the need for greater public education about site hazards, the need for better assessment of risks to health and the environment from the sites, and avoiding the generation of additional FUSRAP contaminated soils (Appendix B).

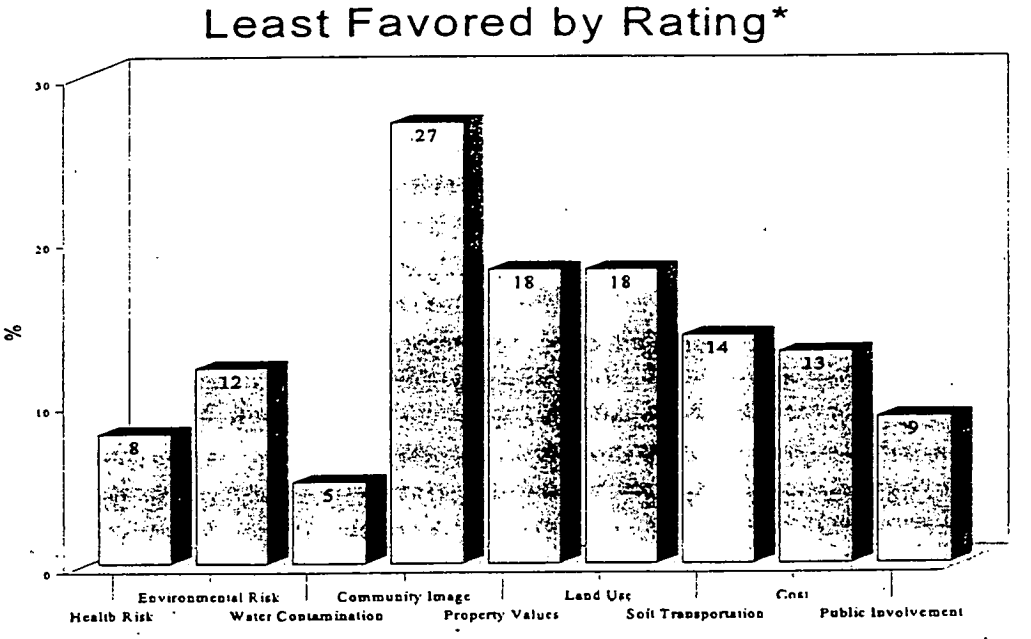
Consistent with overall concerns over public distrust, there is also widespread concern with the issue of culpability (i.e., pinpointing "blame" or responsibility for site contamination and identifying a responsible party). This concern resonates strongly throughout respondent comments, despite the fact that the federal government assumes all costs for FUSRAP site cleanup (Appendix B).

### 2.4.1 Water Contamination

Overall, water contamination received the highest percentage of positive ratings (66% or nearly two-thirds of 4s and 5s) and the fewest 1s and 2s (only 5%) (Figure 2.5). This concern was of particular importance to those respondents who supported disposing of contaminated soils outside of St. Louis County (Appendix C). The relatively high concern expressed on this issue would also seem to confirm why institutional controls, onsite disposal, and consolidation and capping ranked low on the scale of preferred remedies.




*Percent respondents choosing 4s or 5s on a 1-5 rating scale




*Percent respondents choosing 1s or 2s on a 1-5 rating scale

**Figure 2.5 Cleanup Concerns**

Four of eight respondent comments under the category of water contamination expressed concerns with the possible contamination of Coldwater Creek and the Missouri River as a result of SLAPS, and the need for ongoing monitoring of ground- and surface water contaminant levels (Appendix B). While there are numerous explanations for this high level of concern, one possible explanation is media coverage of this particular aspect of FUSRAP.

Not only has this issue been frequently mentioned in news accounts but, more recently, it has even become linked to other water quality issues in the area, including chemical "de-icer" runoff from Lambert-St. Louis Airport. In this instance, de-icer from Lambert is alleged to become mixed with radiation from SLAPS as it leaches into Coldwater Creek (Uhlenbrock, 1995: 1). Both sources of contamination have generated contention between DOE, the local community, and the Missouri Department of Natural Resources. Moreover, groundwater contamination has been cited by Missouri officials as a concern at SLAPS. Missouri DNR is opposed to consolidation of material at SLAPS in part because of the possibility of further groundwater contamination (Uhlenbrock, 1993).

### 2.4.2 Health Risks and Risks to the Environment

Some St. Louis area officials have expressed concern about potential health risks from FUSRAP. These range from general distrust of DOE's assurances of the slight risk to the public's health from contaminated soil (due to fears that even if the risks are currently slight, a proliferation of new disposal sites in St. Louis might lead to additional contamination of neighboring properties) to an alleged "cluster" of leukemia in the area around Latty Avenue (Reynolds concerned, 1994; Kaemmerer, 1994c; Betz, 1994). The survey results suggest that this concern also resonates strongly with members of the public.

Health concerns had the second highest average score (4.2), garnering 59% 4s and 5s and 8% 1s and 2s (Figure 2.5). Environmental risks, by contrast, were not nearly as high (average score = 3.9), generating only 53% 4s and 5s and 12% 1s and 2s (Figure 2.5). As with the issue of water contamination, health risks to the community were of particular concern to those respondents who support offsite disposal. Although women are generally more concerned with this issue than men (Appendix C), the high ratings given to health concerns indicate a widespread consensus over the importance of possible contamination from the FUSRAP sites and of their potentially adverse health effects. Again, this finding is consistent with other site-specific studies of hazardous waste management issues (Bailey, et. al., 1992; Groothuis and Miller, 1994).

Health risks appear to hold a special primacy among the public and constitute a special test of "fairness" to many community stakeholders (Bailey, et. al., 1992; Mazmanian and Morell, 1990). Comments by respondents appear to buttress this interpretation. For many who live near FUSRAP sites, risk, especially to health, is conceived mostly in consequential terms; as an estimate of the potential magnitude of some hazard *if* it should occur, as opposed to its *likelihood* of occurrence, which is small (Wildavsky, 1988; 1995; U.S. CBO, 1994).

Respondents most frequently cited anecdotal evidence of health problems, particularly to children, associated with possible exposure to radionuclides from FUSRAP. Far fewer comments were made regarding risks to animals or plants (Appendix B). Judging by the tone of many of the health-related comments, health concerns are also tied to a sense of public outrage.

Consistent with the volatility of the health risk issue, comments by some respondents also exhibit a high degree (greater than in other categories) of *skepticism*, e.g., comments to the effect that the sites pose no visible risk to public health (Appendix B). In short, despite the generally high ranking of concern attendant to this issue, comments among respondents are sharply divergent over its importance.

### 2.4.3 Public Involvement: Why Highly Rated?

Considerable research suggests that extensive dialogue with citizens is necessary when siting new waste management facilities, cleaning up old ones, or selecting remediation technologies. This dialogue is needed to clearly identify public concerns, maximize the range of options considered by decision makers, ascertain the need for remedies, and to protect underlying societal values of popular sovereignty and political equality (Gerrard, 1994; Rabe, 1994; U.S. DOE, 1991; Sheak and Cianciolo, 1993).

DOE has mandated that its program offices work with communities to identify future use options for contaminated sites undergoing cleanup. This process includes, among other things, designing a site-specific public participation process able to evaluate the opportunities, constraints, and viewpoints associated with future use, cleanup standards, and associated issues (Salvesen, 1994).

Aside from the legal requirements of conducting such exercises, there are other benefits of public involvement, including enhancing the perceived fairness of the decision making process, creating joint responsibility for the mitigation of risk, overcoming resistance to siting storage and disposal facilities, and acknowledging that the public actually contributes to improving technical solutions (Renn, et. al., 1993; Fischer, 1993; Greenberg and Schneider, 1994; Mazmanian and Morell, 1990).

Overall, the need for public involvement generated the second highest ratings of 4s and 5s (57%) and the third lowest ratings of 1s and 2s (9%). Women were generally more convinced of the necessity of involving the public in determining cleanup options than were men (Appendix C). Approximately one-third of respondents who offered comments cited a desire for enhanced public involvement in the selection of cleanup options through provision of better site-specific information to the general public, full release of all relevant information and referenda on specific cleanup options "put to a vote at the community level." Justifications for involvement range from the need for people in the area "to have their say in the matter" to "failure on the part of government and the news media to inform (the) public about this whole situation" (Appendix B).

Ironically, some respondents acknowledged that the public may not be knowledgeable enough to make actual decisions about the site and that "they only know what (the) media and government tell them." Despite this assessment, lack of familiarity with the FUSRAP site appears to serve as vindication for public involvement. For example, a cross-tabulation between support for public involvement and familiarity with the St. Louis FUSRAP site finds that the less familiar a survey respondent was with the site *prior to the survey*, the greater the support for public involvement, as if involvement might somehow *enhance* public knowledge in the future (Appendix C).

### 2.4.4 Cleanup Costs

There is ample evidence from recent studies that the general public is becoming increasingly concerned about the potentially high costs of radionuclide-contaminated site cleanup (Kraft, 1994; Greenberg and Schneider, 1994). This is contrary to previous findings that suggest that the public is not highly concerned over cleanup costs, or that cleanup must be performed 'at any cost.' (Portney, 1989).

Overall, cleanup costs engendered a high percentage (49%) of 4s and 5s and a small percentage of 1s and 2s (13%) (Figure 2.5). Of those respondents who oppose the two most costly remediation options (treatment and offsite disposal), cost is rated a primary concern (Appendix C). Moreover, cost of cleanup is a highly rated concerned among those respondents who support the least expensive cleanup option (maintaining the site) (Appendix C). Thus, it appears that estimated cost influenced the sample population's preferred remediation options.

Those respondents who indicated high concern with cleanup costs were also less likely to have previously participated in FUSRAP-related activities (Appendix C). This relationship is consistent with another significant association -- those respondents who have not been involved in FUSRAP activities are less supportive of the most expensive cleanup option (treatment) (Appendix C). In addition, as can be gauged by respondent comments, there is a widespread perception that much money has, up to now, been wasted on irrelevant studies and bureaucratic delays.

On the other hand, respondents gave the two most expensive remediation options their highest overall ratings. This may be due to the perception that, while fiscal restraint is desirable, it should not be practiced at the expense of protecting human health. This is reflected in respondents' ranking of human health and water contamination over cost, and in their comments that included such statements as "my health is worth any cost" and "consequences are more important that dollars" (Appendix B).

### 2.4.5 Community Image

Community image is a surrogate for perceived stigma stemming from the presence of a contaminated site. 'Stigma' is the perception of loss of future economic opportunities due to the belief that environmental legacies deter certain businesses from moving to a community, or

encourage others to leave. It includes damage to a community's reputation or image; as well as stress, pervasive dread, fear, and even anger from living with an environmental legacy. While difficult to quantify, some contend that stigma from hazardous or radioactive waste sites is likely to be associated with high public perceptions of risk to health and the environment, intense negative imagery of a community, and adverse effects on jobs and the local economy (Flynn, et. al., 1992; Slovic, et. al., 1991).

The lowest rated of public concerns, community image generated the fewest 4 and 5 ratings (32%) and the largest percentage of 1s and 2s (27%) (Figure 2.5). The less a respondent is concerned with community image, the less likely it is that s/he will support treatment or offsite disposal--probably because of the very high estimated costs of these two remediation options (Appendix C). Respondent comments amplify this interpretation.

In essence, there is little perceived stigma among our sample of respondents. This is contrary to the opinion of some leaders in the St. Louis area, as reported by the media (Harrison, 1991). One respondent reported that the image of contaminated material at St. Louis imposing an "intolerable political burden . . . is greatly exaggerated" (Appendix B).

Other explanations for the lack of a perceived 'stigma' associated with the presence of FUSRAP lie in the fact that the site is located in an industrial area and, as one respondent reports "the area is already blighted," to the perception that the region is generally painted in the worst possible light by some environmental activists. Also, confirming the importance of palpable risks to the public, is the perception that, as another respondent phrased it, the area may be 'bad' "but for reasons (other) than community image" (Appendix B).

### 2.4.6 Property Values and Future Land Use

While there is considerable debate over the impact of contaminated sites on nearby property values, actual as well as perceived impacts are difficult to discern. In areas where land is in high demand fears of contamination may be offset by permitting sale at or near market values (Scholtz 1989; Page and Rabinowitz 1993: 473-481). This may be accomplished through providing special purchase agreements and long escrow periods covering the duration of remedial actions. As in other Superfund contexts, future use options for such land is partly dependent upon the ability to negotiate cleanup standards (Cameron and Solomon, 1990; Graham and Sadowitz, 1994).

This issue has been a concern in St. Louis and has been expressed, most recently, in debate over so-called "brownfield" re-development. Like many large cities, St. Louis has a number of formerly contaminated sites that, to one degree or another, have been cleaned up but are still designated as "Superfund" sites. This label has deterred investors from redevelopment activities (Lambrecht, 1995: 4A).

In regards to FUSRAP, property adjacent to SLAPS has been used for public parks and ball fields. Some residents claim no one knew that SLAPS was used for storage of radioactive material or that the contamination had migrated across the street. DOE claims that the contamination, (well within DOE guidelines and less than 10 mrem/year), is insufficient to pose a risk to public health and that the fields were still usable. This claim was met with skepticism. In 1987 the ball fields were permanently closed and used as disposal grounds for airport construction debris. About 80 private properties in the vicinity of SLAPS are contaminated.

The city of Berkeley, which leases the ball fields, has been permitted by the St. Louis Airport Authority to shut them down and prevent trespassing. Ironically, while the city wants the fields to remain closed, many residents have stated at public hearings they want the ball fields open. DOE has proposed developing a package consisting of new recreational fields and restoring the old ball fields in exchange for a permanent disposal facility at SLAPS.

Among survey respondents, issues of property values and future land use were relatively low-ranked concerns, garnering, respectively, 53 and 47% of high ratings (4s and 5s). Each received 18% of low ratings (1s and 2s) (Figure 2.5). While property value concerns are relatively low in rank, there is a strong, discernible relationship between concern over the impact of a FUSRAP site on property values and proximity to a site. Comparing proximity to SLAPS (1-2 miles, 2-6 miles, and greater than 6 miles) and level of concern over property values (low, moderate, high), we found that the closer to SLAPS one resides, the greater this level of concern (Appendix C). We also found that those who are more concerned with future land use restrictions are less likely to support two of the onsite cleanup options (consolidation and capping or maintaining the site) and more likely to support offsite disposal (Appendix C).

Respondent comments may help to explain the somewhat ambivalent rating given to the concern over the effect of the FUSRAP site on property values. Over half of those respondents with comments on this issue report that property value impacts from FUSRAP are largely inconsequential: there are few residential areas in the vicinity of the sites, FUSRAP sites lie in an industrial district, and, if real estate transactions do occur some time in the future, as one respondent notes "corporations may eventually buy very cheaply." Moreover, as another respondent reports, lower property values translate into lower rent. At least two respondents, one a city official in Hazelwood, report that perceived health risks from the sites may have deleterious effects on property values when owners go to sell their property (Appendix B).

Likewise, comments on the issue of future land use restrictions may also help to partially explain its relatively lower ratings. Some respondents report that because the airport site is owned by St Louis airport, its future use is restricted anyway. Others report that placing restrictions on the site for certain purposes (e.g., a wildlife refuge, or just to restrict human exposure to contaminants) may actually be beneficial to the community.

### 2.4.7 Contaminated Soil Transport

While transport of contaminated soil is a low-ranked concern, it is not an unimportant one. It received few very low ratings (14%) and the second fewest positive ratings (42% 4s and 5s) (Figure 2.5). Those most concerned with transport, not surprisingly, tend to favor institutional controls and site management (Appendix C). This may be due to the fact that this is the one onsite management remedy that requires no additional excavation or hauling of contaminated material.

Although far more respondents favor offsite disposal than onsite management, over half of all written comments indicate a concern with "exporting" or "transferring" the problem elsewhere, ensuring the careful transport of contaminated soil, and not contaminating additional sites through transport (Appendix B). This ambivalence toward offsite disposal, despite an overall unfavorable reaction to onsite management methods, may also explain the overall high ranking for treatment by respondents.

## 2.5 Willingness to Become Involved

A variety of options to encourage public involvement are prescribed under CERCLA, including disseminating public information and holding public meetings. Respondents were provided a considerable range of choices for involvement on the survey--ranging from relatively passive actions (receiving a newsletter) up to more progressively active measures (e.g., a telephone hotline, video, computer bulletin board, site tour, public meeting, and workshop). 76.6% of respondents indicated an interest in participating in some type of activity to "learn more about and/or express (their) views" on the St. Louis FUSRAP site remediation (Figure 2.6A).

By rank order (percent of total number of selected activities), reading a newsletter sent via mail was, by far, the most popular activity (31.8%) (Figure 2.6B). This was followed by attending a public meeting (14.6%), participating in a site tour (12.5%), calling a telephone information "hotline" (11.7%), attending a workshop (9.0%), visiting the DOE Information Center (7.6%), sending off for a videocassette about FUSRAP (7.0%), and using a computer bulletin board system to obtain more information (3.2%). Activities identified by respondents under the "other" category (2.6% of respondents) included: conducting a public referendum on cleanup alternatives, joining a cleanup awareness group, and learning more about the cleanup through reading newspaper articles.

Although the most passive involvement option (reading a newsletter) was also the most favored, this should not be interpreted as a preference for passivity over activity for two reasons. First, the next most favored option after reading a newsletter was attending a public meeting--a measure more active than, for example, using a telephone "hotline" (which was ranked fourth). Second, most respondents may prefer activities that will provide them an opportunity to learn about the program, rather than directly participating in, for example, decision making.

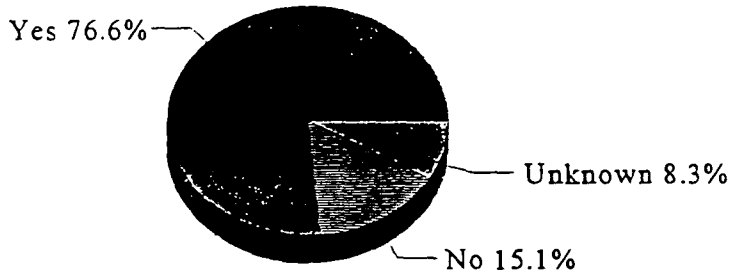
## 2.6 Media Coverage and Knowledge of Site

Respondents were asked to rank on a scale of 1 to 5 their familiarity with the St. Louis FUSRAP site prior to the completion of the survey (1=not familiar; 5=very familiar). The vast majority of respondents indicated little to no familiarity with the FUSRAP site prior to the survey (63% 1s and 2s). 9% were somewhat familiar with the site (giving a rating of 3) and 11% were very familiar with the site (giving a rating of either "4" or "5") (Figure 2.7A).

These familiarity ratings beg the question: why were respondents willing to complete a survey and provide a considerable number of comments (Appendix B) about a waste site with which they had limited familiarity? One possible explanation may lie in the extensive media coverage that has been provided on contentious issues involving hazardous or contaminated sites. From this surge of information including news stories that typically contain fervent opinions, members of the public - particularly those who reside near waste sites - have developed their own set of concerns associated with contaminated materials.

In addition to the familiarity rating, respondents were asked to identify the source of their information on the St. Louis FUSRAP site. Of the total number of sources listed (111 sources were identified), the primary source of information was the newspaper (44.2%) (Figure 2.7B). This was followed by television (25.2%), driving by or working near the site (9.0%), radio (5.4%). mailings (4.5%), residence being located near the site (4.5%), public meetings/workshops (3.6%), and word-of-mouth (3.6%).

A. Participators versus Nonparticipators




B. Respondents Interested/Not Interested in Public Involvement

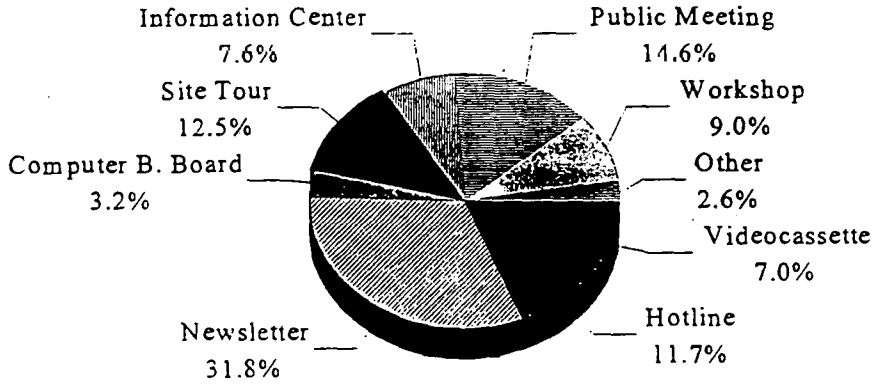
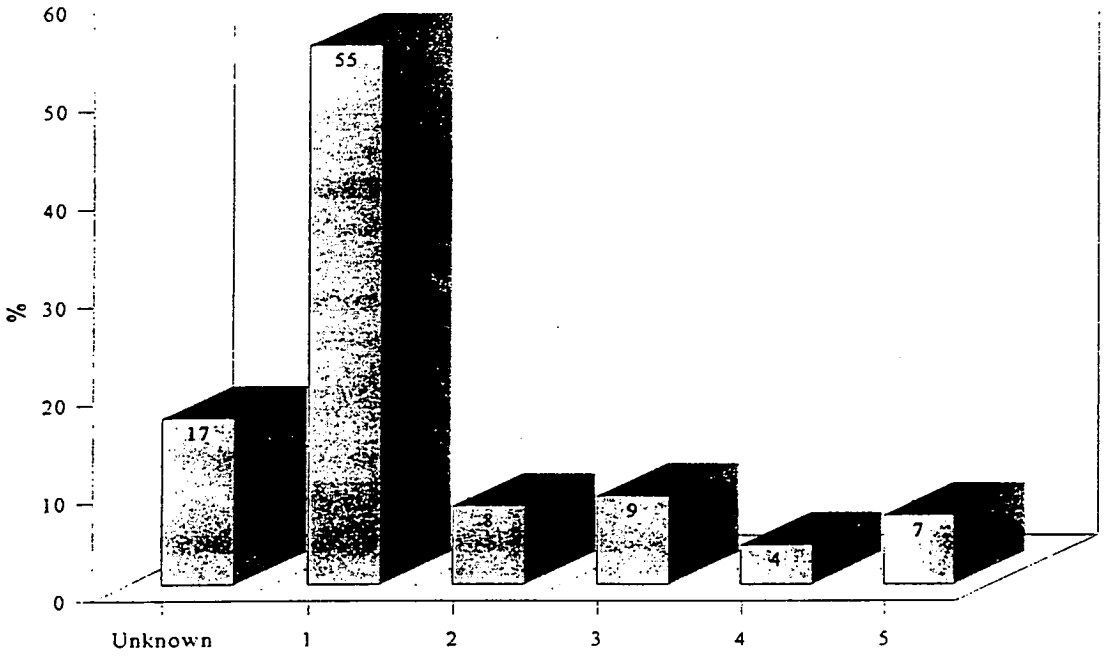



Figure 2.6 Willingness to Become Involved

A. Familiarity Rating




1=Not Familiar 5=Very Familiar

B. Sources of Information

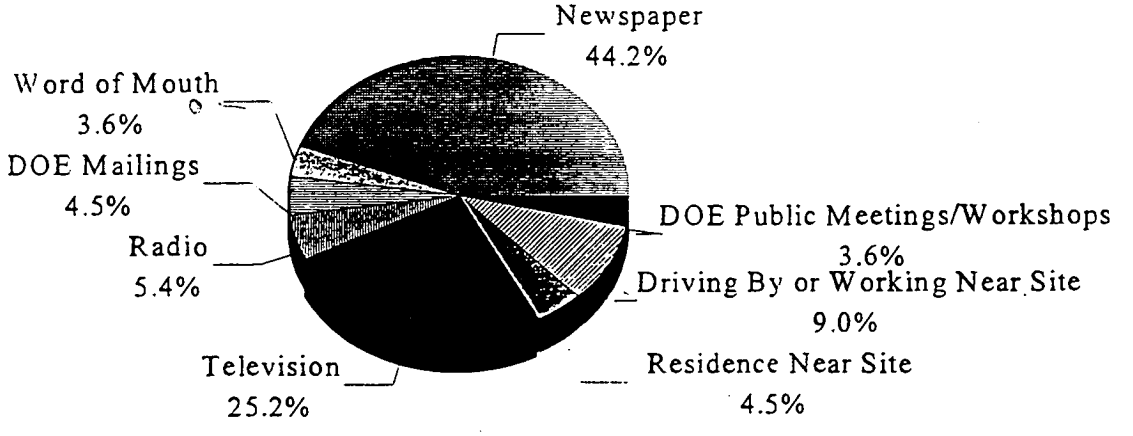



**Figure 2.7 Prior Familiarity with St. Louis FUSRAP Site**

# 3. CONCLUSIONS

The public attitudes survey of the St. Louis site offers *insights* into general community preferences and concerns and *identifies* public perceptions of potential cleanup remedies. These perceptions may differ in important ways from reality, particularly since prior to receiving the survey, a majority of respondents were unfamiliar with FUSRAP. Moreover, less than one-quarter have participated in FUSRAP-related activities.

This being the case, what can we infer from these findings? Respondent preferences, concerns, and perceptions should be interpreted on two levels. The first level pertains to the complex effort to clean up a radionuclide-contaminated site in a densely-populated metropolitan area. The second level encompasses more general concerns about the role of government in protecting public health and the environment through proper stewardship of environmental legacies. At their root, both levels share a common thread: the need to balance public wishes with legal requirements.

This chapter discusses this common thread through the lens of two sets of survey findings--those pertaining to participation and preferred remedies. We conclude this chapter by providing two sets of recommendations. These relate, respectively, to: (1) improving public education toward FUSRAP in communities adjacent to the St. Louis sites; and (2) improving cleanup process decision-making.

## 3.1 Participation: Past Ambivalence, Future Uncertainty

Surprisingly, the same proportion of respondents who admit to never having participated in FUSRAP activities say they *would be interested* in participating in the future. Moreover, those who say they want to participate prefer activities that convey information from FUSRAP to the public rather than solicit the latter's preferences (e.g., read a newsletter rather than attend a workshop). This finding converges with another: opportunities for involvement are regarded as important because they may enhance public understanding. According to respondents, while the public may not be knowledgeable enough to make cleanup decisions, their concurrence in decisions is essential. Ironically, respondents appear to be of two minds: they want to help determine cleanup options, but the majority prefers passive over active participation.

## 3.2 Remedies: No "Magic Bullet"

Respondents view potential cleanup alternatives designed to provide onsite management remedies at the St. Louis site unfavorably, with the exception of options that leave the site virtually undisturbed. In short, if DOE intends to excavate contaminated soil, respondents seem to be saying, then either ship it out of the community or treat it and ship out the residue. Conversely, if contaminated material is "safe enough" to be left under institutional control, then don't excavate it.

Moreover, treatment and excavation with offsite disposal are the most highly-regarded remedies because they are seen as most protective of the concerns of respondents (e.g., public health, water contamination). Finally, the modest range between the ranking of the most and least favored remedies results from the perception that each of them has some problems.

### 3.3 General Concerns: Perspective

Not surprisingly, the highest-ranked concerns that had the fewest low-ratings were those viewed by respondents as most directly affecting individual health and well-being. Those perceived to be less important have less of an effect on these issues. This is significant for two reasons. First, respondents appear to feel that the St. Louis FUSRAP site is probably not, in the larger sense, a very important environmental priority. Decision makers should simply do what is needed to reduce the potential threat posed by FUSRAP as quickly, economically, and sensibly as possible.

Second, respondent comments associated with the most highly rated concerns appear generalizable to other issues, especially to waste management problems caused by previous activities (e.g., "legacy" issues). The most striking and consistent of these comments relate to: care of future generations; better overall assessment of risks; avoiding future problems; taking responsibility for past harm; and, avoiding unnecessary and "wasteful" expenditures to solve the problem.

### 3.4 Tentative Lessons

Survey responses pose two paradoxes: (1) despite a lack of knowledge about the problems associated with cleanup, there is a clear consensus that the public should be involved in cleanup decisions; and (2) some paths to cleanup preferred by respondents may be difficult to pursue because the laws and regulations governing cleanup prescribe a hierarchy of criteria that must be evaluated (Table 3.1).

These criteria fall into three categories: "threshold," "balancing," and "modifying" (U. S. DOE, 1992; 1993). All alternatives must meet threshold criteria. If two options protect human health and the environment equally, then balancing criteria are used to determine which option is more effective (i.e., cheaper, longer-lasting). If there are still no compelling advantages between options, then modifying criteria are employed to incorporate *public acceptability* of options. Thus, once suitable options are selected, efforts must still be made to incorporate public concerns when implementing those options.

On the one hand, decision makers need to understand what the public wants in order to select acceptable cleanup remedies. While there are no guarantees that all public concerns can be accommodated, at least these concerns can be made transparent. Then, after a radiological assessment that includes an uncertainty analysis is performed, the actual risks of a site can be compared to these perceived risks.

On the other hand, there is no way to ensure that public conviction and legal requirements will agree. Inasmuch as survey findings clarify the preferences and concerns of the affected community, they help identify the perceptual barriers that need to be overcome to implement legally-required mandates and surmount the disparity between perceived and actual risks.

Table 3.1 Criteria for Assessing FUSRAP Cleanup Options Under NEPA and CERCLA

| | |
|---|---|
| Threshold Criteria | Protection of human health and the environment. |
| | Compliance with applicable or relevant and appropriate requirements ("ARARs"). |
| Balancing Criteria | Long-term effectiveness and permanence of the method (i.e., ability to isolate contaminated material from the environment, and the irretrievable costs associated with these decisions). |
| | Implementability of the method (i.e., its practical feasibility). |
| | Cost (which cannot be considered the sole determining factor). |
| | Short-term effectiveness (i.e., the environmental impact of remedial methods on ecological and societal resources). |
| | Ability to reduce toxicity, mobility, and volume of waste through treatment. |
| Modifying Criteria | State acceptance. |
| | Community acceptance. |

Source: U. S. DOE, *The Superfund Remedial Investigation/Feasibility Study Process, Fact Sheet*, OER-0030, Oak Ridge, TN: Office of Environmental Restoration and Waste Management, Oak Ridge Operations, DOE, Fall, 1992.

What lessons does this suggest? Three come to mind. First, continued efforts must be made to educate the public about the problems entailed in meeting their preferences through the CERCLA/NEPA process. Second, efforts also must be made to help members of the public better understand how the site remedy cleanup process may be able to address their concerns in innovative ways. And third, the uncertainty analysis may help elucidate the effort required to reduce the disparity between perceived and actual risks so that the public may more objectively assess any proposed cleanup remedy. The final section of this chapter suggests some practical ways these efforts may be implemented.

## 3.5 Recommendations

This section contains two sets of recommendations derived from the major survey findings. These recommendations prescribe improvements to public education and the process of cleanup decision making and suggest ways to address cleanup concerns held by members of the public.

### 3.5.1 Improving Public Education about FUSRAP: Reform from the Top-Down

As was noted in Chapter 2, public awareness of FUSRAP is markedly low among residents adjacent to the St. Louis sites (about 37% of respondents were familiar with the St. L...

63% were not). Moreover, for those familiar with FUSRAP, the primary source of information was the printed word--newspaper accounts of FUSRAP were the source of information for most respondents--television was a secondary source of information. In essence, most of the time, there was little of newsworthy attention emanating from FUSRAP to warrant much TV coverage.

As a result of these findings, efforts to increase awareness of the St. Louis FUSRAP sites within neighboring communities ought to pursue a proactive strategy that combines improved print and televised media coverage. Of necessity, this strategy might be defined as a "top-down" approach. FUSRAP community relations personnel would take the lead in improving the dissemination of basic information to the public about the program through four methods, as described below:

- Run more advertisements in local print media (both the St. Louis Post-Dispatch and north county weeklies; e.g., the Florissant Valley Reporter) regarding upcoming FUSRAP activities, site tours, public meetings, and other special events.

- Distribute to local reporters news releases that are essentially "ready-to-go" stories that need little re-write to be reprinted in these local media. Not only will this save time, but it will increase the likelihood that these stories will be printed.

- Publish in-house a one-page "flyer" or newsletter that could provide similar information about upcoming events, meetings, and issues, including Radioactive Waste Task Force meetings. Distribute this newsletter (which could be published either monthly or quarterly) to local community groups, those on community relations mailing lists, and others. This newsletter may also enhance public participation in FUSRAP activities.

- Use the televised media as a *supplement* to these activities. Local cable systems, and even broadcast system channels (particularly public television stations) may offer community access channels that provide lists of upcoming community activities. These community access channels could be used to provide information on upcoming events or meetings, as well as "where to get more information" about these activities. These media outlets could also be used to publicize the availability of the one-page flyer.

### 3.5.2 Improving Cleanup Decision-Making: Reform from the Bottom-Up

Improving cleanup decision-making is a two-fold process. First, it entails enhancing the process by which the public's concerns are represented in forums designed to solicit their views. Second, it encompasses efforts to ensure that public input will actually be of value in formulating final cleanup decisions. In order to accomplish both components of this process, FUSRAP community relations efforts must address the public's concerns that any and all cleanup decisions be transparent, sensible, and cost-effective.

This message resonates throughout the survey results, and is exemplified by the finding that, if contaminated soil is going to be excavated, then the overall public preference is to either ship it

out of the community or treat it and ship out the residue. Conversely, if conta..... .erial is "safe enough" to be left under institutional control, then common sense would dictate that it not be excavated. In short, community relations efforts must take their cue from the "b. ..om up," by responding to such publicly-articulated concerns.

Our general recommendations in this regard fall into two categories. First, efforts must be made to ensure, where possible, that public preferences in regards to cleanup be factored into the site-specific cleanup decision making process (e.g., through the local Radioactive Waste Task Force's decision making and alternative review processes). Second, efforts must be made to address overall perceived risks once decisions to actually implement certain cleanup alternatives are made. As examples of the first category of efforts, we recommend the following:

- Avoid any option that is likely to result in the generation of additional contaminated material and that is likely to constrain the future land use or other options of future generations who, for obvious reasons, cannot directly influence present day decisions.

- Consider the lower cost option or set of options whenever possible (when two or more options are available as remedies) in order to save money and efficiently manage a specific contaminated site problem.

- Favor, in sequential order, options that can treat contaminated soils so as to reduce their volume and/or prevent their migration or further spread across a site; that result in offsite, out-of-county disposal of contaminated soils and residue; and/or, that result in institutional controls on remaining sites, or parts of sites, that are slightly contaminated. The latter option, like the first two, make future use of a contaminated site more viable.

In order to encompass the perceived risks noted by survey respondents, chronicled in Chapter 2, the same bottom-up approach should be utilized through the community relations process. Where possible, the St. Louis Site Remediation Task Force might also be enlisted in these efforts. Examples of specific strategies that could be pursued include the following:

- Address, in detail, and as accurately as possible, perceived risks (e.g., water contamination and health risks from the FUSRAP site) in relation to actual risks.

- Address, in detail, the range of possible remediation options that may be pursued for a given site. This includes communicating to the public as clearly as possible how different options may be pursued in sequence, or even in parallel, and the advantages, disadvantages, and tradeoffs required in doing so.

- Address, as candidly as possible, the scientific and technical limitations of the risk assessment data that goes into cleanup decision making.

This latter set of recommendations can only be implemented when actual risks associated with a FUSRAP site are well-defined. They can be most *effectively* implemented when the determination of these actual risks is based on sound scientific and technical information that incorporates an analysis of the uncertainties of the radiological assessment results.

The larger report from which this report is derived describes the benefits of utilizing an uncertainty analysis and demonstrates how the analysis can be incorporated into a radiological assessment (Feldman, et. al., 1995). Further, that report illustrates ways to graphically depict the site's radiological contamination in order to increase the transparency of health and environmental risks from radiological contamination. By elucidating means to decrease the disparity between perceived and actual risks, decision makers, risk communicators, and the public may be brought closer together in their understanding of the problems plaguing a contaminated site. In this way, durable, albeit potentially difficult, decisions can better be made that have wide consensus.

APPENDIX A

# ST. LOUIS SITE INTEREST AND ISSUES SURVEY

*We thank you for your support in assisting us with our research!* Your views, opinions, and concerns are extremely important to our efforts to better understand issues at the St. Louis site. All information on this survey will be maintained in complete confidence.

1. Which of the following activities have you previously participated in regarding the clean-up of the St. Louis site? *(Circle number(s) of all that apply or describe under "other" option)*

   1 Visited the Department of Energy (DOE) Information Center
   2 Attended a public meeting
   3 Attended a workshop/class
   4 Contacted elected and/or DOE/contractor officials
   5 None of the above
   6 Other:_____

2a. How many DOE public meetings regarding the St. Louis site have you attended? *(Circle number)*

   1 None
   2 One or two
   3 Two to five
   4 More than five

2b. If you have not attended any public meetings, why not? *(Circle number or describe under "other" option)*

   1 Was not aware meetings were held
   2 Schedule conflicts
   3 Not interested
   4 Other_____

3. A number of clean-up alternatives have been studied for the St. Louis site. On a scale of 1 to 5, rate your preference for the following described **potential** alternatives. *(Circle your rating: (1) I absolutely do not support the use of this alternative. (5) I strongly support the use of this alternative.)* Circle "0" if you have "no opinion" on the alternative.

| Alternative | No opinion | Do not support/ Strongly support | | | | |
|---|---|---|---|---|---|---|
| a. Institutional Controls & Site Maintenance<br>**Use institutional controls such as deed restrictions to restrict public access to contaminated areas**<br>**Estimated Cost: $90 million**<br>Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |
| b. Consolidation and Capping<br>**Excavate contaminated soils, consolidate the soil near the St. Louis Airport site, and cover with a barrier**<br>**Estimated Cost: $300 million**<br>Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |
| c. Excavation and On-Site Disposal<br>**Excavate contaminated soils and dispose in an above ground bunker built at the St. Louis Airport site**<br>**Estimated Cost: $475 million**<br>Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |
| d. Excavation and Off-Site Disposal<br>**Excavate contaminated soils and dispose at a facility located outside of St. Louis County**<br>**Estimated Cost: Disposal in-state - $580 million**<br>**Disposal out-of-state - $920 million**<br>Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |
| e. Treatment of Contaminated Soil<br>**Treat contaminated soils, reuse the clean soil, and dispose contaminated residue at a commercial facility located outside of St. Louis County**<br>**Estimated Cost: $1.3 billion**<br>Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |

4. On a scale of 1 to 5, rate your concern on each of the following issues related to the cleanup of the St. Louis site. (Circle your rating: *1 = I have little or no concern. 5 = I am very concerned.* **If you feel you have insufficient knowledge to rate or comment on an issue, circle** "0". Please feel free to use the extra space, including the back of this page, for comments.)

| Issue | Insufficient Knowledge | Little/No Concern to Major Concern | | | | |
|---|---|---|---|---|---|---|
| a. **Health risks to community members** Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |
| b. **Environmental risks to plants & animals** Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |
| c. **Groundwater/surface water contamination** Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |
| d. **Image of local community** Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |
| e. **Effect on local property values** Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |
| f. **Future restrictions on land use (i.e. limited use of land)** Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |
| g. **Transport of soils removed from site** Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |
| h. **Cost of clean-up** Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |
| i. **Involvement of public in determining clean-up options** Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |
| j. Other issue? (provide & please rank):_____ Comments:_____ | 0 | 1 | 2 | 3 | 4 | 5 |

5. In your opinion, what are the characteristics that you feel are important to make a cleanup remedy acceptable?

_____
_____
_____
_____

6. What activities would you participate in to learn more about and/or to express your views on the clean-up of St. Louis site? *(Circle number(s) of all that apply or describe under "other" option)*

1 Read a newsletter sent via mail
2 Call a "hotline" telephone number
3 Send off for videocassette
4 Use a computer bulletin board system
5 Participate in a site tour
6 Stop by the Information Center
7 Attend a public meeting
8 Attend a workshop
9 Not interested and do not intend to participate
10 Other_____

*Finally, we need to ask you a few personal questions to compare your views and interests with those of other community members.*

7. What is your gender? *(Circle number)*

1 male
2 female

8. Do any children under 18 reside in your household? *(Circle number)*

1 yes
2 no

9. Which of the following best describes your formal education? *(Circle number)*

1 Less than high school
2 High school graduate
3 Some college
4 College graduate
5 Post-Graduate or Professional Degrees

10. Are you presently: *(Circle number)*

1 Employed
2 Retired
3 Other

11. Please describe your current occupation (or your previous occupation if retired).

_____

12. Approximately how far do you live from the St. Louis International Airport? *(Circle number)*

1 0-½ mile
2 ½-1 mile
3 1-2 miles
4 2-6 miles
5 greater than 6 miles

13. Approximately how far do you live from the McKinley Bridge in downtown St. Louis? *(Circle number)*

1 0-¼ mile
2 ¼-½ mile
3 ½-¾ mile
4 ¾-1 mile
5 greater than 1 mile

14. On a scale of 1 to 5, rate your familiarity with the St. Louis FUSRAP waste site prior to this survey. (Circle your rating: *1 = I was not familiar with the FUSRAP waste site prior to this survey. 5 = I was very familiar with the FUSRAP waste site prior to this survey.)*

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Please identify the source(s) of your information, e.g. newspaper: _____

_____

*We appreciate you taking your time to participate in our survey.*

Respondent #_____

# APPENDIX B
## ST. LOUIS SITE INTEREST AND ISSUES SURVEY--COMMENTS[1]

1. Which of the following activities have you previously participated in regarding the clean-up of the St. Louis site? (Circle number(s) of all that apply or describe under "other" option).

- We have heard very little about this problem.
- Worked next to Latty Ave. site, had contact with 2 officials.
- Introduced Berkeley youth council to site, encouraged resident participation.
- Visited site on Latty Avenue; read up on nuclear dangers.
- Spoke at DOE public meetings. (p)
- Went to get a print-out at the office. (p)
- Member of (St. Louis city/county) task force. (p)
- I am on the Hazelwood City council and the Latty Avenue waste is in my ward.
- I assisted in the clean-up of my block (street/alley).
- Community newsletters, weekly journal newspaper.
- Driven by it-know where it is.

2b. If you have not attended any public meetings, why not? *(Circle number or describe under "other" option).*

- Not aware waste site was so close to where I live.
- Didn't receive any notification of meetings.
- Was not interested in public bickering.
- Was not too concerned.
- Do not feel this was a high priority problem at this time.
- Unusually busy with work and other activities.
- The one I attended was to tell us "update" they still haven't decided what to do. I don't feel that I am going to have any input as to what decisions will be made. (p)
- Don't get out at night. In this neighborhood, they don't even put trash in the dumpsters.
- Was not aware where/when held.
- Only very limited media attention has been given to these sites unlike Times Beach.
- Not aware of such a site.
- My understanding is that there is no dialogue; residents voice opinions and fears with no response. Residents are addicted to NIMBY.
- Very busy, had no time.
- Haven't felt strongly enough to attend.
- Priorities didn't allow time.
- Too far away from where we live.
- Not interested at this stage in my life.
- Site is 6 miles away
- Leave alone. Do not disturb.
- Didn't think of it being important.
- Physically unable (cancer).
- Unable to attend.
- Don't trust bureaucratic bungling of environmental wackos.
- Do not go out at night, and my age 82 yrs.

---

[1]Key: p= comments from pre-implementation evaluation respondents (See section 1.2)

3. A number of clean-up alternatives have been studied for the St. Louis site. On a scale of 1 to 5, rate your preference for the following described potential alternatives. *(Circle your rating: (1) I absolutely do not support the use of this alternative. (5) I strongly support the use of this alternative.)* Circle "0" if you have "no opinion" on the alternative.

3a. Institutional Controls & Site Maintenance

- I am not aware of anyone suffering ill effects and these sites have been contaminated for many years.
- Try to use part of the land 'as is' where possible; clean up some areas if not too costly.
- I don't believe this would satisfy public health and safety concerns. However, I'm open to it being proved otherwise. (p)
- Highly contaminated areas would have to be remediated. Temporary (short-term solution). (p)
- Only if it is dangerous. Otherwise do b or c below. (p)
- Don't know much about situation to have an opinion.
- Deed and site use restriction is most logical, but for it to cost $90 million is preposterous.
- I don't know the amount of contamination but the ground has been there for years. I don't know what it is hurting.
- Would be hard to do . . . kids would still break into any fence.
- I think the danger has been exaggerated that time, "stirring up", and monitoring would be best.
- Too costly.

3b. Consolidation and Capping

- At who's cost? Taxpayer? I think not. As a mother I say, you make the mess, you clean it up. Parties who put it there are responsible.
- Get the crap out of populated areas, out of St. Louis.
- I don't not approve of shot-gun approach. Use common sense to clean largest area at least expense.
- A costly interim step if excavation is to occur. (p)
- 100% in favor or #c below. (p)
- Why not cover with runway concrete? (That way) low-level radiation shouldn't be a problem.
- What good is this going to do?
- They already covered these sites but the threat is still there.
- Where would they put it? Isn't any room. Would they dump it on the cemetery? Should be someplace where they can really dispose of it.
- This already exist(s), and a fence (has been) around it for 25 years; located near McDonnell Douglas.
- This is probably best alternative - others either cost too much and go overboard in effort.
- Too costly.

3c. Excavation and On-Site Disposal

- Only if stored in a secure above ground bunker above the creek flood plain level. (p)
- B or c, depending on which method is considered technically-superior and cost-effective. (p)
- Permanent (long term disposal option). (p)
- Move soil to less populated area. (p)
- 100% in favor or #b above. (p)
- It seems like you would not want radioactive soil in the middle of a population center.
- Greatest possible containment, least possible leaching into the ground and water table; most cost effective
- Too costly.

3d. Excavation and Off-Site Disposal

- I don't think so.
- If securely transported with no loss of contaminated soil. Store at Fulton Nuclear plant site. (p)
- This appears to be an enormous, costly undertaking, curtailing other risks. (p)

- Only if waste would go to Weldon Spring (which is impossible, more than likely). (p)
- Move it and contaminate more land? Forget it. (p)
- Need to know danger of excavation.
- Only if burned and totally destroyed; not stored.
- Morally is this correct? Why also create problems for more people.
- Cost is a factor to me here.
- Why St. Louis Airport Site?
- Should have never left Weldon Spring in the first place; charge to Mallinkrodt or Atomic division.
- Yes we want it moved out of the St. Louis area.
- Don't put it near children.
- No one else deserves to have our contaminated soil either!
- Too costly.

3e. Treatment of Contaminated Soil

- This is extreme overkill.
- Why subject anybody to contaminated soil. Will the commercial facility have or find a way to utilize the contaminated residue?
- Not if incineration is the process for treatment. (p)
- If as an alternative to a&b but contaminated soil could also remain at airport site if properly stored-to become a permanent local marker for beginning of atomic age! (p)
- Would probably be cost prohibitive at this time. Technology changes may allow this option in the future. (p)
- If push comes to shove I could support this. Behind b or c above. (p)
- Need to know danger of excavation.
- Seems too expensive.
- Not cost-effective.
- Agree with treating, but not reusing.
- Treat - reuse and dispose; send bill to U.S. government.
- If the ground is contaminated at a high level (it) should be removed.
- It seems there is a place somewhere in the US you can store these wastes away from populated areas.
- What would they do with the wash water?
- Preferred over 'd'.
- Where to dispose (of) residue may result in higher costs.
- What type of commercial facility are your talking about?
- Too costly.

**General comments on question #3**

- Various combinations (a then e or a then c) could be done. The public wants action now and DOE has not been able to slow the public demands for (a) solution. Getting the public to have confidence (in) DOE is a must. (p)
- Lambert Field - not hurting anyone - shouldn't spend. Latty Avenue - industrial area.

**4. On a scale of 1 to 5, rate your concern on each of the following issues related to the cleanup of the St. Louis site. (Circle your rating: *1 = I have little or no concern. 5 = I am very concerned.* If you feel you have insufficient knowledge to rate or comment on an issue, circle "0".**

4a. Health risks to community members

- When my children were young they played in the creek that ran by this property to my yard; probable health problems later in their lives.
- You know the waste will leak in he future, earthquake, cracks.

- I'm concerned. but have little knowledge: ball fields near sites were closed permanently a couple of years ago and we were never apprised of the real danger. The government(s) act in a very high-handed fashion which annoys the hell out of me.
- I worked by the most contaminated site for 25 years. (p)
- On the basis of information I have, I do not believe there is a general population risk. There may be significant risks to specific residents and employees. (p)
- Public does not understand health risk issues. (p)
- No record of anyone getting sick or dying. For years much of this land was used for ball diamonds. Thousands of people participated and no record of illness. (p)
- Health risks are always an important issue.
- Reportedly there have been health problems due to the Latty Avenue site, which occurred in the 8700-8800 block of Nyflot Avenue.
- Residents of Nyflot, Heather Lane, and commercial workers on Hazelwood Ave. are affected.
- I wouldn't want to be too close.
- Very high, I suppose-but we've been exposed to many for too long already. Feel sorry for the younger generation.
- Can't be as dangerous as gun shots!

**4b. Environmental risks to plants & animals**

- Few in this area.
- I don't feel informed enough to comment, but would anticipate risks as low. (p)
- Also risks from soils/sediment in Coldwater Creek and surrounding disposal areas. (p)
- Keep on monitoring and if hot spots develop, then take of it. (p)
- It's where we live; food supply.
- Too high, no doubt!

**4c. Groundwater/surface water contamination**

- Maybe.
- Minor.
- This may be more of a problem: the DOE & Kay Drey are clearly at odds over this issue. (p)
- Keep on monitoring and if hot spots develop, then take (care) of them. (p)
- Feeds into Coldwater Creek and into Missouri River close to St. Louis County water treatment north plant.
- I feel radioactive waste is flowing into Coldwater Creek.
- St. Louis County Water Co. pollutes our drinking water releasing low (amounts too small to do any harm. I was told) of radioactive waste into it (our water supply)
- Times Field dioxin is one example of how we seem to be polluting our water - this is a possibility.
- A very real probability.

**4d. Image of local community**

- Bad news.
- (On) property values especially.
- Minor.
- Don't understand the question. If you mean it reflects badly on local community, this may be so because the low-level waste has been painted as intolerable pollution burden. I am inclined to believe this to have been greatly exaggerated. (p)
- False image (industrial area). (p)
- The only problem I see is the environmentalists keep insisting it is bad for all and as a result enough people believe (it) and pressure is applied to remove it. (p)
- Low-level waste site is not a good image for a community.
- can't be too good-but do people really care anymore?
- It's already bad for other reasons.

- These areas are already "blighted," slums.
- Looks aren't everything.
- Our image is already formed by illiteracy, filth, and crime.

**4e. Effect on local property values**

- I rent, so low property value means lower rent.
- Few homes in this area.
- Minor.
- Except for those in the immediate vicinity of the haul routes etc, no effect on property values.(p)
- False effect (industrial area). (p)
- I don't know. (p)
- Again, I see no problem here. If it is safe then you should publicize it. (p)
- No one wants to live on or near a health risk location.
- Site's impact on the value and sale of real estate in the area (I am 2.2 miles from the Latty site).
- I expect large corporations to eventually buy very cheap.
- Residents of nearby streets have told me they have to inform prospective customers if they sell their house(s).
- I would think that close proximity to a contaminated site would (should) lower property values.
- Already bad.
- These areas are already "blighted," slums.
- No visible effect from contamination - crime, filth lower my property values.

**4f. Future restrictions on land use (i.e. limited use of land)**

- I thought the airport owned this land?
- Restrict public access.
- I would agree but want more facts.
- Without assurances, local communities (are likely to) believe sites like the Berkeley ball fields (will) remain unusable. (p)
- Best method with least cost, does not solve environmental issues/problems. (p)
- I repeat myself. Monitor it and the land, (i.e. ball fields, etc.) (p)
- I thought there was restriction on it already.
- Turn site into wildlife area with restricted access.
- Loss of land use to the community; loss of tax base in community due to underdeveloped land.
- Use one area away from all populated areas.
- If they can guarantee the land is safe, not concerned; otherwise - concerned.
- Where would we dump these contaminants? Sell it (or pay) the Indians to accept it on their reservations? or dump it into rivers or oceans?
- Airport property already has noise pollution - not useful anyway; not much "viable" property near McKinley Bridge
- Should be fenced.
- Maybe it needs to be used in a different capacity.

**4g. Transport of soils removed from site**

- Must be done carefully.
- Makes no sense to move it elsewhere.
- No.
- I am definitely against this.
- I am concerned over unnecessary cost (and) in handling (it) not to worsen present situation. (p)
- Risk of death from transportation higher than any (from onsite) contamination. (p)
- When you move it you only contaminate other soils. Leave it alone. Let a sleeping dog lie. (p)
- Too expensive.

- How can you do this safely and then, who else gets the problem?
- Transfers problem to someone else.
- Airborne particles and the spilling of soils when transported.
- This should not be allowed.
- Don't move it.
- Again: Where (to) will it go? It is not fit to go anywhere!
- Removed to where? cost?
- Can do safely.
- I just can't see dumping our problem on someone else.

**4h. Cost of clean-up**

- In the cost v. health question, my health is worth any cost.
- Least cost to the responsible party.
- Should be a minimum in a common sense approach.
- Charge the people/companies who created it.
- I feel that the major contributor to the cause of this contamination be the major contributor monetarily.
- Could be done cheaper. (p)
- This should be kept to a minimum, consistent with best estimate of danger to public health. (p)
- The St. Louis site has existed for nearly 50 years. With site cleanup nationally to cost hundreds of billions of dollars, these studies will go on for decades to delay any action! (p)
- DOE clean-up will be expensive. (p)
- It is too expensive; rather than clean (it) up use the money to buy all the land around the site, fence it and continue to monitor it. (p)
- Who bears the cost?
- Cost isn't important if it will save the earth, our children, and animals. We want the earth clean.
- Those who are responsible should pay the tab.
- Will those who are liable be responsible?
- If the government's involved, it will cost extra, I'm sure.
- Likely to be a bureaucratic boondoggle and political rip-off.
- It creates jobs
- The "Industry Giants" are the "Big" transgressors. Why did we allow this? Let them pay to clean up <u>their</u> mess.
- Consequences more important than the $.
- As a taxpayer, yes - as a middle to upper-class income, hurts to feel the bite.
- The company/person that caused it pays-not the taxpayers.
- Everyone benefits from the clean-up (everyone pays a share) - TAXES.
- Make the people who are the cause pay for clean up.
- Taxpayer lacks the money for clean-up.

**4i. Involvement of public in determining clean-up options**

- People in this populated area should have their say in the matter.
- Public is not knowledgeable to make determination.
- Why? Not educated in this area.
- There are definitive and proper ways to clean it up, do it!
- Total failure on part of government and news media to inform public about this whole situation.
- Very important but want the truth. Don't want b.s. Not being totally upfront with us about acquiring an illness from this.
- Public should be fully involved but it should be <u>fully informed</u> involvement. (p)
- (Committee would be helpful); public is emotional and not educated on issues. (p)
- The environmental groups are too strong and insist on anything that they support. Usually they get there way. Not fair to people of my belief. (p)
- List options and costs; put to vote at community level.

- Let those responsible pay.
- They only know what media and government tell them.
- Hazelwood and Berkeley should have some control (of) the cleanup.
- In retrospect: Isn't it a little late trying to get the public involved now?
- People need to be part of the solution - not part of the problem.
- Our neighborhood residents do not have the knowledge to make such judgements.

4j. Other issue

- Make responsible party pay; whoever created the waste site should pay for the cleanup.
- Impact of action taken on future generations.
- Don't make and use dangerous material that can't be disposed of.
- Education of larger community regarding topic; programs in schools.
- Will the danger still persist? (p)
- I want to see an objective risk assessment for the different sites, including acknowledged 'hot spots'. Use lung cancer deaths due to passive exposure among general public (≈ 3000 LCDs/yr) as bench mark. (p)
- Public outcry (not in my backyard); public does not understand issues/problems. (p)
- Honest publicity about safety; spend some of the clean up money for this. (p)
- The future generations' lives are the most important.
- Problems and solutions: if a certain problem occurs in any cleanup, what steps will be taken to resolve (it)? For example, contaminated water table due to leakage.
- (Site) Latty Avenue/McDonnell-Douglas Bldg.
- I have played and driven over the Latty site before it was identified as dangerous.
- Did the public know of the dumping in the first place. Where were the city fathers then?
- Stop production of waste. If you don't know how to dispose of a waste properly, it makes sense not to produce (it) until you can get rid of it sensibly.
- We live in a polluted world and have done a "great" job of poisoning our environment (planet earth). Are we too late to save "Mother Earth"? P.S. (I am serious!)
- Big waste of money.
- If this is not fixed, it will come back to haunt all of us.
- Is St. Louis Sit truly dangerous to community?

General comments on Question #4

- The individuals (private companies), companies (under gov't. contract), and government is the primary cause; where are they? (p)

**5. In your opinion, what are the characteristics that you feel are important to make a cleanup remedy acceptable?**

- Let's do it right so our children don't have to do it again.
- The site should be returned to its 'pre-waste' condition and the individuals/companies responsible for creating the waste site should pay for the cost of cleanup.
- Inaccessible (?)
- Cost and where the money will come from. Who pays and for how long?
- Cost, done in timely manner and (in) the proper way.
- If we don't make it in the first place, there would be nothing to clean up.
- The use of common sense in determining the action to be taken.
- If done in a timely manner by people that have definite knowledge of what they are talking about.
- Monitor groundwater regularly, use least costly method, notify public of permanent site.
- Cost of cleanup and who pays. Also, effects on environment. Those responsible for causing problem should pay for its cleanup.
- To completely get the contaminated soil cleaned up ASAP.
- Cost and Risk factors.

- Must be realistic in cost and still guarantee a toxic-free environment.
- Health for plants, animals, and humans.
- Least harm to humans and least cost to taxpayers.
- Move contaminated soil out of St. Louis county.
- Education on the issue; community decision through a vote of the people.
- To protect all of humanity from any potential harm; to go about it in the most cost-effective and efficient way; to insure no future harm of any consequence; to solve problem and not leave it for next person; to learn how to avoid future problems.
- Long term public and environmental hazard reduction; returning existing site to a useable condition; minimize migration of radioactivity off-site; Cost to public. (p)
- Urban site useable. (p)
- Contamination completely removed. (p)
- Acceptable only if 100% decontaminated or securely contained to last the life of the contamination. (p)
- Cost-effective consistent with objective determination of level of risk to the general public. (p)
- Long-term disposal (do it once). Get public to trust DOE decisions, minimize risk to personnel working on project (do not transport), use local site/people. (p)
- Prevention of groundwater contamination; Protection from public access; Safe transport, if necessary, out of urban area and away from streams and creeks. (p)
- None at this time of survey.
- Build a sealed (so it doesn't leak) bunker - fill it and seal it tight. Then you can check on regular basis that should satisfy all. Except the environmentalists. (p)
- Fiscal responsibility tied in with health concerns and future site use. (p)
- Cost, total cleanup with little or no danger to residents.
- People working together, not just (in) neighborhoods). What good does it do if only one or two do good while others don't care? It makes one give up trying.
- Cost, concern for people.
- It must be safe for the community and the environment. Also, the area should be restricted for a period of time once the cleanup process is complete.
- The best solution is complete disposal of the contaminants, not just transferring our problems elsewhere.
- Reasonable cost.
- Good communication with the public is a must.
- Reasonable costs; safeguard future generations. Use common sense and be not afraid to use methods proven successful by other countries. Keep politics out of it.
- It must be permanently destroyed and safe for all to live without fear of added cancer potential.
- Agreement on severity of problem; agreement on proper method of correction.
- Effluent cost, environmental safety.
- Material which is actually harmful should be removed to a safe location. Material which is contaminated but can be disposed of in a manner which can contain radioactive material should be used to reduce the bulk of the waste, which is a risk in itself.
- Not to just move it from one site to another. Must be safe both (water and air) so we do not have further contamination.
- Accepting the responsibility of site without trying to lay blame. Involve the public through complete step-by-step communication. And a timely progression to completion.
- No clean-up site in or near St. Louis, the county, the Mississippi, or west St. Louis.
- Use as few tax dollars as possible and where possible, the companies responsible should share as much of the cost as possible.
- Safe for community. Make efficient use of money and resources. Be able to cleanup and reuse contaminated soils.
- Location, cost.
- I have not kept up with the alternatives . . . I do understand there are health risks to the community at-large. These are my main concerns.
- It (SLAPS) contaminates the water in Cold Water Creek; that water runs into the Missouri River to the Mississippi. Am drinking water from the latter.
- Cost-health issue. Use of land by public. Permanent disposal; not temporary solution.

- No harm to public.
- How it affects our long term health, the manner in which the soil is removed, where it's going, and what are the effects of the contaminated soil at SLAPS. It should be moved by government, they put it here in World War II.
- Limit exposure of public; limit environmental damage; do not damage area's image.
- If problems occur for indefinite period of time, will they allow immediate or complete shutdown or removal?
- The effect on current use of surrounding land and what effect this would have future use of land in 2050-2075, etc.
- Relocation of contaminated soil (safely).
- Low cost/lay the cost on the companies that cause the contamination.
- Make the public aware of site and what are the content of the waste.
- No groundwater, air or environmental contamination; offsite storage.
- Lots and lots and lots of information from various sources
- I think a lot of it is blown out of proportion and some get rich off it.
- Total scraping and hauling dirt to a concentrated area
- What guarantee the dirt will be clean if burned on the spot? It's the U.S.government's baby
- Why after 50 years is the public being informed?
- People's health and protect plants and animals.
- That the cleanup is effective and that it does not cause additional and/or other problems.
- Cost control; environmentally safe living area.
- (Make) whoever put it there clean it up at their expense.
- Health risks; cost.
- Cost, health.
- Isolation of the contaminants from mankind and the environment at a *reasonable* cost.
- The cost. If it is necessary.
- Don't put it near kids and animals - off to itself. Put it all in one place.
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- Get it cleaned up completely; be able to reuse the land; make sure airport has enough room; make recreational area for teenagers.
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- That the same treatment for clean-up is done in equal amounts to the north and south sides of the city.
- Whatever option chosen, that it is to low (to) monitor and reported to the public involved, not hidden in some exclusive paper, etc.
- All the elements on page 3.
- Balance of cost and effectiveness.
- People must be able to live and work safely in the area surrounding the sites. The airport needs a buffer zone so I don't mind contaminated soil stored there as long as it can be done safely.
- Store in concrete bunker covered with asphalt to make (it) waterproof.
- The remedy must not hurt any human and do a minimum harm to the environment.
- Both sides should answer specific questions, citing the method or authority (i.e., agency findings and data) by which they reached their answers and perhaps the degree of agreement by those with equivalent training and experience to the respondents. Thus, the public could determine the degree [illegible] or other.
- I really don't know to much about this.
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- Quick and safe at any cost.
- Measures employed to clean up site; where and how contaminated soil disposed; long and short term effects; how do we avoid future contamination from occurring.
- Make polluters pay-enforce stricter laws and huge fines! P.S. I have no ready answer to your question
- Excavate contaminated soils and dispose at a facility located outside of St. Louis County
- Remove waste and render inactive
- Safe to all concerned.

- Offsite disposal.
- The cost should be paid for by the parties that caused this problem. The health concerns and property value concerns of past, present, and future residents must be taken into consideration.
- Do not disturb. See note at end.
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Source(s) of Information

- Newspaper, Berkeley bulletins, public meetings.
- Newspaper.
- TV news, newspaper.
- TV.
- Radio, TV.
- Newspaper.
- Newspaper.
- Worked next to site.
- Newspaper and TV.
- TV, newspaper.
- Newspaper, TV.
- TV, newspaper, work less than 1/4 mile from SLAPS.
- Personal contact, newspaper, word of mouth.
- Newspapers, TV, radio.
- Televised stoppage of softball leagues.
- Newspaper and radio.
- We used to live close to the airport.
- Newspaper, radio, workshop.
- Newspaper and TV.
- St. Louis Post-Dispatch.
- I drive past the airport almost once a week. I have read a little about it in the paper.
- Newspaper, radio and TV.
- TV and newspaper.
- Newspaper.
- Newspaper, meetings, I read everything about it.
- Local TV news and driving by to work.
- News channel, paper, neighbors.
- Newspaper and TV.
- Newspaper and TV.
- Newspaper.
- St. Louis Post-Dispatch, North County Journal.
- Newspaper, TV news, community mailings.
- Newspaper, TV.
- Newspaper: periodically, the local newspapers run a two or three-day feature article on the sites; these are . . . comprehensive and well-researched.
- Newspaper, TV news.
- Newspaper, TV, radio. Has been reported on over a period of years.
- Newspaper.
- I drove by the site daily for 30 years on my way to work.
- Newspaper and TV.
- TV news.
- I deliver to McDonnell-Douglas and Futura and have seen and asked questions [illegible] sites in North County (chemical company truck driver.)
- Word of mouth.
- Personal sight from riding bike around neighborhood; saw the signs.
- Very familiar with low level radioactive waste site at airport; not familiar with acronym FUSRAP.
- Mailings, TV news.
- Hazelwood newsletter and North County Journal.
- Newspaper.
- I did not know it by that name. TV news and newspaper articles.
- None.
- St. Louis Post Dispatch.

- Newspaper.
- Mailings from people involved.
- Live in neighborhood.
- I grew up and lived for 25 years about 1 mile from the Latty Ave. waste site. See attached letter for more information.
- Newspapers/news on TV/Correspondence/Occasional meetings.
- Passing by closed area near Lambert airport and newspaper.
- Newspapers and TV.
- Newspaper.
- First-hand - use to play softball there; got some information from newspaper, has been out of town, thou...
- Newspaper, T.V., airport information.
- Newspaper, driving past.
- St. Louis Post Dispatch.
- Newspaper.
- St. Louis Post Dispatch Paper.
- Newspaper.
- Media, friends (word-of-mouth).
- TV.
- Not known.
- Newspaper & TV.
- Newspaper and news.

**Additional comments in margins or on back of survey**

- I feel the reason all this has come up is because someone paid someone to dump it there and told no one about it. All manufacturers of these waste products should have to be controlled by the government on their disposal of it. I feel a product should not be made if it has non-disposable waste associated with it. I do not believe in nuclear power and the waste it causes. I have voted against it.
- My wife and I have lived here for nearly 3 years. We knew the site near the airport was there but it is our understanding that the site was unharmful to health or property. That it all we knew. Education is probably the first step for cleanup. Let us know what is going on. Send us information in the mail, that it easier than us trying to get to a meeting. Let us know why the site has been sitting there since WWII and what effect it has had on health and property in the past. Tell us what can be done to clean it up, if that is even necessary.
- I feel too much is being made of dioxin sites (e.g., Times Beach).
- Until receiving this survey I had never really thought much about this situation and how it could affect me.
- My pleasure, but you can see I don't expect much action to correct this hazard. Are any clean-up officials drinking that discharge coming out of the St. Charles quarry site? (p)
- Note: You did not inquire about work location in connection with either site. For 11 1/2 years, worked at McDonnell-Douglas between 1/4-1/2 mile from airport site and on occasions, cycled past it to get to other local McDonnell Douglas buildings. (p)
- The McKinley Bridge area is near my home . . . it is (in) an old neighborhood . . . since Times Beach is contaminated, why not use that site instead of SLDS and SLAPS?
- The soil is contaminated at the (Berkeley city) park north of SLAPS. We cannot use this site; used to have picnics there.
- This really interests me; childhood years spent about a half mile from McKinley Bridge in small Illinois town.
- Does Mallinkrodt have any responsibility for the site? (since they were responsible).
- My wife and I are concerned because we live 200-300 yards from Coldwater Creek in which this site drains. We are 5-6 miles from the St. Louis airport.
- I believe if this stored material is hazardous to one's health, it should be contained or removed. I think the elected or appointed officials should be able to do this.
- I have completed pages 2-3. I strongly feel that if this survey will not change this situation then devil waste my time by studying how I will suffer in this terrible living condition.

- Why didn't they pick a better site to put it in the first place?
- Why not incinerate waste?
- Still would make good recreational area for teens - spend the money on cleanup, not on lottery
- This survey and most literature on the subject is too wordy and long-winded. Doesn't feel like concentrating on it, although he wishes he could get the info. in an easier form
- Used to work at McDonnell-Douglas. Used to play softball there. I feel it's safe in its present state-even to play softball there. Creek is very contaminated.
- Doesn't feel like he can answer these questions because his answer "isn't any better than anybody else's" - isn't fair to move the waste somewhere else, but what do we do with it?
- Let the polluters defray the cost of cleaning up the mess they created for us innocent and ignorant bystanders. Were there no laws to protect us? None now? Or are they being ignored?
- I concur with my husband-We always try to rectify "things" after the facts; why not before irreparable damage can be (has been) done?
- Cost should be considered.
- All six of our children played on athletic fields in area.
- Not a native of MO. Planning on leaving MO. soon as possible. Thank you.
- I have resided in the proximity of the Airport for the last 50 years. 18 years on the southside, in the Village of Edmundson and 32 years on the north side in Hazelwood. During this period I have lost 2 wives through cancer. I cannot say the cancer was caused by the waste stored in the area. I am 81 years of age and do not have cancer to my knowledge. My opinion is to let sleeping dogs lie. By attempting to move this stockpile we will stir it up and make some airborne creating more problems. Leave as is and do not try to add more to it.
- Paralyzed-wheel chair, 3 years. I had new water pipes from street to bathroom 3 years ago. La Clede(?) Gas Co. put in pipes 3 years from street to back of house 3 years ago-This neighborhood was all deserted for 20 years nothing but mud from West Florissant to Highway 70. I have lived here for 30 years if needed (?) to I can fix it up. Where can I go at my age and its the city fault. If they had fixed it 20 years ago this wouldn't have happened. I reported it for years about the mud and fell in the mud many times when I went to hospital - I was weak when I came home and still did nothing now they want to take my home from me. My husband died 5 years ago 70 year old (son died) 4 years ago- we have Section eight ? and here a few years ago. $500 a month rent I could fix this place up for that. Born 4-1-10/82 years old
- On your map you showed Hwy 70 going into 367 - WRONG. Hwy 70 goes out to Lambert Int. Airport - who sketched the map doesn't know St. Louis.
- I'm aware of what's going on, but haven't been to any meetings. No real opinion- not sure what they should do. I understand that its potentially hazardous, but surveys and all that may be overkill. Used to play softball on that field. A lot of environmental problems only seem to be "important" until the story isn't in the newspaper anymore.
- This all sounds like more bungling of the facts which will just cost me more taxes!
- Not familiar with DOE/or site cleanup. Unable to accurately answer questionnaire.
- I know very little about subject so I have no comments.
- Sorry I'm so late returning this!

# APPENDIX C
# SIGNIFICANTLY RELATED CONCERNS AND REMEDIES

| Significant Relationships | Confidence Level[1] | Interpretation of Relationships | Strength of Relationship[2] |
|---|---|---|---|
| Past participation in FUSRAP-related activities and concern with cost | 98.0% | Those individuals who have participated in FUSRAP-related activities are less concerned with cleanup costs. | Moderate |
| Past participation in FUSRAP-related activities and support of treatment | 98.9% | Those individuals who have participated in FUSRAP-related activities are more supportive of treatment as a remediation option. | Moderate |
| Past participation in FUSRAP-related activities and familiarity with FUSRAP site | 99.8% | Those individuals who have participated in FUSRAP-related activities were more familiar with the FUSRAP site prior to the survey. | Moderate |
| Opposition to treatment and concern with cost | 96.3% | Those individuals who are opposed to treatment as a remediation option are more concerned about the cost of cleanup. | Moderate |
| Favor treatment and proximity to SLAPS | 98.7% | Those individuals who favor treatment as a remediation option live in closer proximity to the SLAPS site. | Moderately strong |
| Favor treatment and concern with community image | 99.8% | Those individuals who favor treatment as a remediation option are more concerned about the image of the local community. | Moderately strong |
| Opposition to excavation and offsite disposal and concern with cost | 95.7% | Those individuals who are opposed to excavation and offsite disposal as a remediation option are more concerned about the cost of cleanup. | Moderate |
| Favor excavation and offsite disposal and concern with health risk | 95.9% | Those individuals who favor excavation and offsite disposal as a remediation option are more concerned about the site's health risk to community members. | Moderate |
| Favor excavation and offsite disposal and concern with water contamination | 94.2% | Those individuals who favor excavation and offsite disposal as a remediation option are more concerned about potential groundwater and surface water contamination. | Moderate |
| Favor excavation and offsite disposal and concern with future land use restrictions | 98.4% | Those individuals who favor excavation and offsite disposal as a remediation option are more concerned about future land use restrictions. | Moderately strong |
| Favor excavation and offsite disposal and concern with community image | 97.5% | Those individuals who favor excavation and offsite disposal as a remediation option are more concerned about the image of the local community. | Moderate |

| Significant Relationships | Confidence Level[1] | Interpretation of Relationships | Strength of Relationship[2] |
|---|---|---|---|
| Favor institutional controls and concern with cost | 97.1% | Those individuals who favor institutional controls as a remediation option are more concerned about cost of cleanup. | Moderate |
| Favor institutional controls and concern with transport of contaminated soils | 96.0% | Those individuals who favor institutional controls as a remediation option are more concerned about the transport of contaminated soils removed from the site. | Moderate |
| Opposition to institutional controls and concern about future land use | 96.9% | Those individuals who oppose institutional controls as a remediation option are more concerned about future restrictions on land use. | Moderately strong |
| Favor consolidation and capping and less formal education | 99.9% | Those individuals who favor consolidation of excavated materials and capping as a remediation option generally have less formal education than those who are opposed to this option. | Moderately strong |
| Opposition to consolidation and capping and concern with land use restrictions | 96.4% | Those individuals who oppose consolidation and capping as a remediation option tend to be more concerned with future land use restrictions. | Moderate |
| Concern with health risks and gender | 98.5% | Women tend to be more concerned with potential health risks to the community than men. | Moderate |
| Concern with water contamination and gender | 99.4% | Women tend to be more concerned with potential groundwater and surface contamination than men. | Moderate |
| Less familiarity with FUSRAP site and concern with public involvement | 99.9% | Those individuals who were less familiar with the FUSRAP site prior to the survey tend to be more concerned about involving the public in choosing cleanup options. | Moderately strong |
| Proximity to SLAPS and concern with property values | 94.4% | Those individuals who live closer to SLAPS (1-2 miles) are more concerned about property values than those who live further away (>2 miles). | Moderate |

[1]Calculated from the Pearson Chi Square statistical test - the percentage in this column represents the probability that the relationship between the two identified factors is not a result of random chance, i.e., There is less than a 3.8% chance that the relationship between institutional control cleanup alternative and the concern over water contamination is a result of random chance and not a true relationship. Only relationships with an approximate 95% confidence level were included in this table.

[2] Based on Cramer's V measure of association: 0=no relationship; .01-.05=negligible; .06-.14=weak; .15-.29=moderate; .30-.49=moderately strong; .5-.69 strong; and .7-.99 very strong.

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