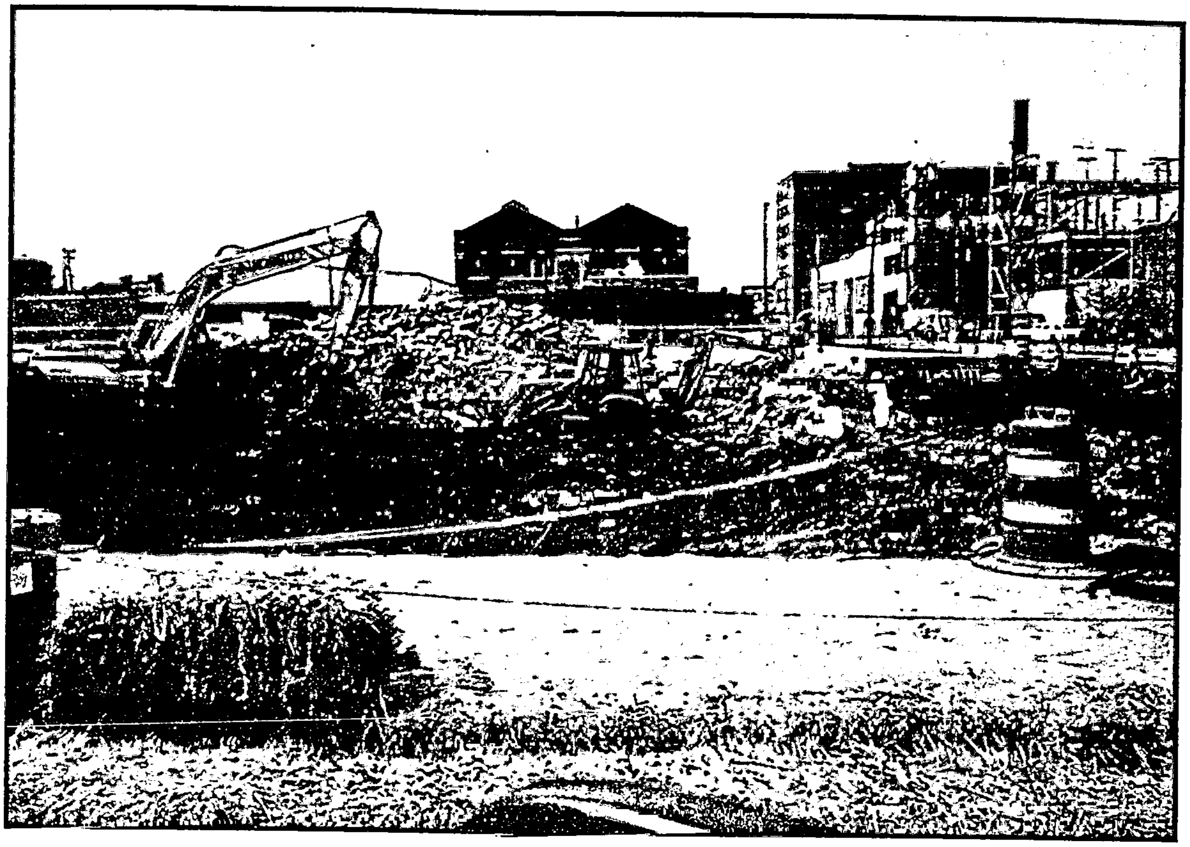
FUSRAP completes Plant 10 cleanup

FUSRAP recently cleaned up an entire city block of the St. Louis Downtown Sito. Known as Plant 10, the area is part of an industrial complex owned by the Mallinckrodt Chemical Company, which plans to redevelop the property.



During . . .

. . . and After

Looking north from Anglerodt Street. Broadway is to the left and the Mississippi River to the right.

200.1e
SLDS1998AR_01.06_0097_a

mmendations Continued from 1

g this fiscal year and the next. officials asked the Task Force to nmend how the money be allo- l.

he recommendations reflect the Force's concern that funding be :ably distributed among the vari- properties in the St. Louis area. Force members also told DOE they thought it important to focus rojects that will be consistent whatever long-term cleanup rec- nendations are developed. \dditionally, as part of its recom- ıdations, the Task Force asked : to ensure that all recommended nup actions will protect human ıth and the environment. Specific recommended activities to ındertaken in fiscal years 1996 1997 include:

ıaluate use of local disposal facili- for minimally contaminated soils.

ıpe: Attempt to obtain approvals n appropriate regulatory agencies, ticularly the State of Missouri. ɔrdination with the U.S. Nuclear ȝulatory Commission and the ıironmental Protection Agency uld also be required.

st: $200,000 per year (total 00,000).

ɔentify and evaluate suitable loca- n(s) for a new in-state disposal or erim storage facility.

ope: Work with the State of ssouri to identify a location(s) for nstruction of a permanent disposal interim storage facility. Identify and e state criteria to identify land areas · evaluation as potential sites.

Critically evaluate existing geologi- l surveys and other siting studies for hazardous waste facilities. Perform supplementary evaluations as needed incorporating values, criteria, and objectives stated in the alternative sites working group report of April 18, 1995.

Cost: $200,000 per year (total $400,000)

• Remove contaminated soils from haul route properties located in North County.

Scope: Continue cleanup efforts along Frost and Hazelwood avenues (public and private properties) by excavating soils alongside the roadways, then restoring roadsides using clean soil. Material located underneath roadways would not be removed. Generated soils could either be stored on a local property under engineered and moni- tored conditions, or shipped to a licensed disposal facility.

Cost: $4 million per year ($8 million total) with the disposal option to be recommended by the Task Force.

• Restore and stabilize the St. Louis Airport Site (SLAPS).

Scope: Projects include:

– Initiate actions to address the con- clusions and recommendations of the Coldwater Creek Panel.

– Based on findings of that panel, address current erosion by mitigating the concentrated contamination in roadside ditches along McDonnell Boulevard.

– Create clean corridor(s) for reloca- tion of multiple utility lines currently located on the south side of McDonnell Boulevard.

– Excavate and remove ballfield hotspots; cover remainder of contami- nated ballfields with two feet of clean soil. Release ballfields for use.

– Ship soils generated by selected hotspot excavations to a licensed dis- posal facility.

Cost: $3.5 million to $4 million per year (total $7 million to $8 million).

• Continue cleanup efforts at the St. Louis Downtown Site (SLDS).

Scope: Plans are to clean up buildings known as the "50 Series" on a phased basis over two years, with work scheduled to begin in July 1996. Actual site restoration measures/tech- niques would be similar to those applied this year for the City Block 1201 cleanup at the SLDS. Resultant soil/rubble with above guideline cont- amination could either be managed on site or shipped to a licensed disposal facility.

Cost: $4 million to $4.5 million per year (total $8 million to $9 million).

• Continue soil treatability investiga- tions for the St. Louis Site.

Scope: Options range from continua- tion of laboratory-based evaluation/ refinement of treatment techniques to deployment of on-site pilot plants to conduct applied tests of field-scale treatment technologies. Use local resources where possible.

Cost: $100,000 to $250,000 per year depending on scope of effort.

The Task Force may modify its rec- ommendations for the ballfields and St. Louis Airport Site (SLAPS) to reflect the conclusions of the Coldwater Creek Panel. (See related story.) The Task Force expects to receive the panel's final written report soon.

Panel assesses site impacts to Coldwater Creek and groundwater

An independent panel of expert geologists and hydrogeologists has delivered its findings about whether the radioactive wastes buried at the St. Louis Airport Site pose a significant threat to Coldwater Creek and deep ground water aquifer. The Task Force is considering the panel's report in developing recommendations for short- and long-term cleanup plans for the St. Louis Site.

The six-member panel was formed in September at the request of the St. Louis Site Remediation Task Force. Panel chairman David W. Miller presented the panel's findings at the January Task Force meeting and a draft report was released in February.

Key issues examined by the panel include the effects of contaminated groundwater at the St. Louis Airport Site (SLAPS) on Coldwater Creek, the effects of surface water runoff from SLAPS on the creek, and the effect of SLAPS on the deep groundwater aquifers.

Panel findings

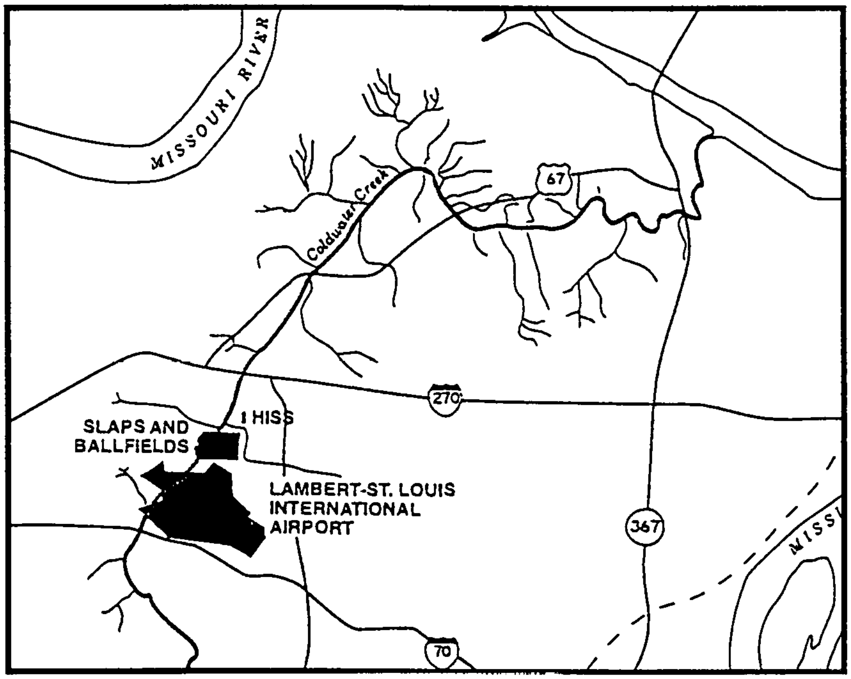
Specifically the panel found:

• Although surface water, sediments, and shallow groundwater quality have been affected in the past by stormwater runoff from SLAPS, "Results of the groundwater modeling also indicate that the levels of contamination that might eventually reach the creek should not impact surface water sediments so that DOE guidelines would be exceeded for at least 100 years.

• Stream bank erosion adjacent to SLAPS and sheet and gully continue to result in contribution of radionuclides into surface waters of Coldwater Creek.

However, the panel also found that erosion appears to have been more significant in the past, prior to construction of a Gabion Wall to control bank erosion and the restoration of vegetative cover over parts of the site.

• The panel determined that the presence of radionuclides in the soil and upper aquifer system "will not have a significant impact on the lower aquifer system within the foreseeable future (100 years). "This conclusion is supported by investigations to date. However, the panel concluded that the deep groundwater system has not yet been sufficiently characterized."



• The panel acknowledged that although wastes are already present at the site, underlying hydrogeological features do not meet criteria for siting a radioactive waste storage or disposal facility.

The panel suggested several actions to address current site conditions.

• The panel expressed concern about "the proximity of radioactive contamination to the creek and the presence of contaminated material in the floodplain," noting that the "stormwater runoff ditches and pipe provide a rapid pathway for potential contaminated migration into the creek . . . therefore, at a minimum a site drainage control and prevention program should be designed and implemented.

• The panel called for the evaluation of additional facilities to maximize erosion protection during periods of flooding along the creek.

• The shallow soil contamination along McDonnell Boulevard and the railroad right-of-way by SLAPS should be considered for removal as part of the ongoing remediation activities.

The panel also concluded that more data is needed "to develop a more complete hydrogeological assessment of the deep groundwater system and a more comprehensive analysis of contaminant sources." The data would be gathered by way of wells and stream gauges.

In addition to Miller, other members of the panel include Thomas Aley, director of the Ozark Underground Laboratory; James Cox, Walsh Environmental, Inc.; and John D. Rockaway, professor and chair, Department of Geological and Petroleum Engineering at the University of Missouri-Rolla.

Serving in a technical advisory role only were Angel Martin, staff hydrologist for the U.S. Geological Survey, and Mimi Garstang, deputy director of the Division of Geology and Land Survey at the Missouri Department of Natural Resources.

aking sense of risk

This is the first of a regular series turing various technical issues per- ıing to the St. Louis Site. This arti- provides an introduction to risk ;essment and how it is used in toration activities.

hat is Risk?

) isk is the chance that some harmful event will occur. In the ;e of environmental cleanups, we ık of risk as the potential for nega- ; health impacts as a result of expo- e to contamination.

Health impacts are generally classi- d as carcinogenic or toxic. rcinogenic risks are quantified as ; risk of contracting cancer over a :time and usually are stated in sci- tific notation. (See discussion below out scientific notation.) Toxic health pacts are non-cancerous illnesses d are quantified using a health lex. A health index of 1 or above is nsidered hazardous. Calculations of k are used to identify threats and lculate cleanup levels.

Because of the probability, risk is pressed as a fraction, without units. takes values from 0 to 1.0. Zero is ; absolute certainty that there is no .k (which can never be shown). One the absolute certainty that a risk will cur. Values between 0 and 1 repre- nt the chance that a risk will occur.

For example, we say that a lifetime ncer risk from carcinogen A at an erage daily dose of B is 1 in 100,000 .00001 or 10^{-5}). If this number is curate, it means that one in every)0,000 people exposed to carcinogen at a lifetime average daily dose of B ll develop cancer over a lifetime. The obability also describes the extra ;k incurred by each individual in that :posed population.

People are more familiar with expressions of risk associated with various activities than they are with risks associated with chemical expo- sures. We speak, for example, of the annual risk of dying as a result of cer- tain activities.

The annual chance of dying in automobile accidents for people who drive the average number of miles is about 1 in 4,000, according to federal statistics. The lifetime risk of develop- ing cancer in the United States is about 1 in 5.

These types of expressions of risk are more familiar, but they mean roughly the same thing as those risks of toxicity from chemical exposure. However, information on death rates from automobile accidents, for exam- ple, is more reliable than statistics pertaining to most chemical risks.

Most of the risk associated with enviromental chemical exposure are not so well known. So although chem- ical risk information often is expressed in the same form as direct- ly-measured risks such as automobile fatalities, chemical risk information is calculated using different methods. Chemical risk information almost always includes estimates where mea- sured risk data are not available.

What is Risk Assessment?

Risk assessment is the science of defining the health effects of exposure to hazardous materials and situations. At the St. Louis Site, risk assessment information helps determine what actions should be taken to clean up the site. Risk assessments are one type of information considered in risk management.

Although risk assessment is a sci- ence, it is not a perfect one. Most sci- entists agree that there is a great deal of uncertainty associated with risk assessment; however, to compensate for this uncertainty, the risk assess- ment process is deliberately conserva- tive. That is, it errs on the side of safe- ty when calculating potential risks to people.

Risk is a function of how much of a contaminant is present (dose), how dangerous a chemical is to humans (toxicity), how the chemical enters the body (method of exposure) and how often a person is exposed to the chemical (level of exposure).

A risk assessment should be able to answer the questions: "What is the problem, and how bad is it?"

Therefore the calculation may be expressed as:

Risk = Dose x Toxicity x Method of Exposure x Level of Exposure

• **Dose.** The dose of a contaminant is represented as the concentration of the compound of concern at the point of human contact. These concentra- tions may be present in soil, sedi- ments, surface water, ground water, or air. If human contact occurs in more than one of these media, the dose in each case must be taken into account to identify the cumulative risk from the contaminant.

• **Toxicity.** The U.S. Environmental Protection Agency and other govern- ment agencies have calculated the toxicity of many hazardous com- pounds. Much of this information is gained from statistical evidence from laboratory tests on animals. Not all compounds have well understood tox- icity values. Special consideration is given to populations such as pregnant women and children that may be especially susceptible to a contami- nant's toxic effects.

• **Method of Exposure.** Exposure to contamination may occur from many routes, including direct ingestion from air inhalation, water consumption, Incidental consumption of soil or wind blown particulates, or eating contaminated foods. Exposure also can occur through direct contact between contaminants and skin.

• **Level of Exposure.** The level of exposure is defined by the activities taking place at the point of exposure. Factors calculated into level of exposure estimates include the amount of time (e.g, hours per day of direct exposure) or volume (e.g, liters of water consumed per day or number of breaths per day).

What is Risk Management?

Risk management is the process of weighing policy alternatives and selecting the most appropriate regulatory action. Risk management is not a science; rather it combines information about risk with economic, political, legal, ethical, and value judgments to reach decisions.

The term "risk management" describes a type of decision making. First, a decision must be made as to whether an assessed risk needs to be reduced to protect public health and the environment. Second, a decision must be made about the means to reduce that risk, should action be deemed necessary.

For environmental cleanups at Superfund sites, risk management decisions are primarily driven by legal requirements. The U.S. Environmental Protection Agency is responsible for developing risk assessment guidelines for Superfund. Current Superfund regulations consider the range of 1 in 10,000 to 1 in 1,000,000 excess lifetime risk of cancer to be acceptable. An excess lifetime risk of cancer is the probability above the 1 in 5 risk of developing cancer in the United States.

Interpreting Risk Numbers

Risk is expressed in *scientific notation*, which is the use of numbers raised to a power, such as 10^4 or 10^{-6}. Writing numbers in scientific notation is much more concise on a page, but that economy of space often sacrifices comprehension for the non-technical audience.

If the number has an exponent, it is multiplied by itself the number of times indicated. (The exponent is the small number to the upper right.) For example, 10^2 (^{2} is the exponent) is 100, or 10 x 10.

Negative exponents are different; a negative exponent indicates a fraction. So 10^{-4} is the same as 1/(10 x 10 x 10 x 10) or 1 divided by (10 x 10 x 10 x 10). This is 1/(10,000), which equals 0.0001. Another way to think about 10^{-4} is to think that it is 10,000 times smaller than 1. Other examples of scientific notation are:

$1.5 \times 10^1 = 15$
$7.3 \times 10^{-4} = 0.00073$
$4.18 \times 10^2 = 418$

References and Further Reading

• *Calculated Risks: the Toxicity and Human Health Risks of Chemicals in Our Environment,* Joseph V. Rodricks

• *Risk Assessment in the Federal Government: Managing the Process,* National Research Council

• *Risk Analysis: A Guide to Principles and Methods for Analyzing Health and Environmental Risks,* John J. Cohrssen and Vincent T. Covello

• *Risk Assessment Guidance in Superfund,* U.S. Environmental Protection Agency

• *Environmental Risks and Hazards,* Susan L. Cutter, ed.

Task Force elects new chair

The St. Louis Site Remediation Task Force unanimously elected Sally P. Price chair at its October meeting.

Former chair Alpha Fowler Bryan resigned from the Task Force because of professional commitments.

Price, a registered nurse, also serves as a member of the FUSRAP committee of the Environmental Management Advisory Board (EMAB), which is a national advisory board to DOE's assistant secretary for environmental management. She also is a member of the St. Louis County Radioactive & Hazardous Waste Oversight Commission.

Anna Ginsburg, director of the St. Louis City Neighborhood Stabilization Office, remains vice chair of the Task Force.

The Task Force was formed in August 1994 to develop a public consensus about cleanup and future courses of action at the St. Louis Site. DOE has agreed to carefully consider the Task Force's recommendations in making its decisions about the site. For more information about the St. Louis Site, the Task Force and its public meetings, call the DOE Public Information Center at (314) 524-4083.

The Task Force meets at 7:30 a.m. the third Tuesday of each month at the Hazelwood Civic Center East, 8689 Dunn Road, Hazelwood.

FUSRAP goes on-line with new Web page

USRAP has joined the world of on-line information and commu- ;ation via the Internet. The program .s established a site, or "home page" ı the global network's World Wide eb. The site is:

tp://www.fusrap.doe.gov

Visitors to the Web site are greeted ' a U.S. map showing the location of JSRAP's 46 cleanup sites in 14 ates. Users can simply click on a ven state for a brief description and e state's sites and their cleanup sta- s. In addition, a menu directs users to fact sheets on a variety of FUSRAP topics, such as detailed site backgrounders, laws and regulations governing the project, program success stories, news releases, and public participation opportunities.

Future upgrades will include site newsletters, video clips, and an administrative record index with downloadable project documents.

The FUSRAP home page includes links to several Web sites of related interest, such as DOE's Environmental Management home page. In addition, users can provide feedback on the FUSRAP home page or otherwise correspond with project officials by way of an automated E-mail feature.

For information on how to use your home computer to access the Internet and the FUSRAP home page, call the DOE Information Center at 524-4083.

)OE Public Information Center
'170 Latty Avenue
}erkeley, MO 63134

BULK RATE US POSTAGE
PAID
HAZELWOOD, MO
PERMIT NO. 215

Your toll-free number to the DOE Public Information Center is 1-800-253-9759

This *Update* is printed on recycled paper.