

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Mel Carnahan, Governor • David A. Shorr, Director

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

November 10, 1993

Mr. David Adler
FUSRAP St. Louis Site Manager
Former Sites Restoration Division
U.S. Department of Energy
Oak Ridge Operations, P.O. Box 2001
Oak Ridge, Tennessee 37831-8723

Dear Mr. Adler:

The MDNR (Missouri Department of Natural Resources) has reviewed the following documents for the FUSRAP (Formerly Utilized Sites Remedial Action Program) St. Louis Site, submitted under cover letter dated July 21, 1993 by the U.S. DOE (Department of Energy):

- Feasibility Study/Environmental Impact Statement for the St. Louis Site, July 1993
- Proposed Plan for the St. Louis Site, July 1993
- Site Suitability Study for the St. Louis Airport Site, July 1993
- Evaluation of Contaminated Sediment Transport in Coldwater Creek, July 1993
- Groundwater Flow and Transport Model for the Airport Area, July 1993
- Letter Report on the Risks Associated with Contaminated Sediments Present in Coldwater Creek, July 1993
- DOE Comment Response to the EPA May 19, 1993 Comments on the February 1993 Draft Feasibility Study and Proposed Plan for the DOE St. Louis FUSRAP Site
- DOE Comment Response to the MDNR May 20, 1993 Comments on the February 1993 Draft Feasibility Study and Proposed Plan for the DOE St. Louis FUSRAP Site

We appreciate the level of effort given to responding to our May 20, 1993 comments; however, the MDNR does not believe that these documents support the DOE's preferred remedial alternative of consolidation and capping at the SLAPS (St. Louis Airport Site). The MDNR position of record is that the hazardous waste landfill site suitability demonstration (10 CSR 25-7.264(2)(N)1.) and design standards (10 CSR 25-7.264(2)(N) and 40 CFR 264 Subpart N) contained in the Missouri Hazardous Waste Management Law and Regulations are relevant and appropriate to any disposal of FUSRAP wastes in Missouri. The DOE must show that the site will

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retard radionuclides and other hazardous constituents, above the regional aquifer, to a degree functionally equivalent to the site suitability demonstration. The shallow ground water at the SLAPS occurs within five to ten feet of the current ground surface. If the DOE shows that the shallow ground water is not interconnected to the regional aquifer directly beneath the proposed disposal area, along with appropriate contaminant retardation studies, then the site may be acceptable for the location of a disposal cell with liners that are functionally equivalent to the hazardous waste landfill liner and cover technology requirements. If these hydrogeologic and contaminant transport demonstrations cannot be made, then additional design features must be provided. We would like to discuss any draft proposals for a liner and cover system that DOE would propose.

The May 20, 1993 comment letter also expressed concern about the lack of progress on the proposed expansion of the HISS (Hazelwood Interim Storage Site). The DOE response did not address this concern. The MDNR will further address this issue in separate correspondence.

Following are specific comments. The numerical designations in the DOE response to the May 20, 1993 comment letter is utilized to reference that letter.

General Comments

1. The term "waste pile" is used in the revised documents to refer to FUSRAP disposal facilities in Missouri. A waste pile is considered a storage facility. Since the feasibility study does not evaluate temporary storage, the permanent facilities evaluated in the feasibility study are more accurately defined as "disposal facilities."
2. (May 20, 1993 Comment no. 3)
 - a. The first part of this comment emphasized the excessive use of institutional controls in the DOE preferred alternative. The MDNR disagrees with the DOE response that institutional controls are a "long-standing practice" to control the use of ground water. This is not true in Missouri. Also, the examples cited of other superfund remedial actions in Missouri are not analogous to the proposed FUSRAP cleanup alternative. Missouri Electric Works has a temporary cap and there is a plan to excavate and incinerate contaminated soils. The Conservation Chemical site is capped with a slurry/grout wall, but ground water is being removed and treated.

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The Wheeling Disposal site is doing a cap and monitor remedy, but there is no ground water contamination off-site. None of these sites will rely on long term off-site institutional controls.

Concerning "access restricted" soils, the DOE response takes a new position which places the responsibility of management of any unexcavated soils on the property owner. This is an unacceptable proposal for federal weapons production waste that have been placed on private property or other property not owned by the DOE. The MDNR believes that institutional controls for contaminated soil are only valid where the DOE owns the property. Where it is clearly demonstrated that no other option is feasible, the DOE must maintain responsibility for the contamination through easements, trust funds, or other option that is determined acceptable to all parties.

Other comments regarding the definition of "access restricted" are made below.

- b. The remainder of the MDNR comment and the DOE response addresses the degree of long term protectiveness related to future use of ground water. Specific technical comments on the basis for the DOE response will be made below under the Site Suitability Study. Additional comments regarding water quality standards are also made below.
- 3. (May 20, 1993 Comment no. 5) The MDNR disagrees with the conclusions in the DOE response drawn from Site Suitability Study regarding the unit 3 clays. Additional comments regarding the Site Suitability Study are listed below.

Comments on the Feasibility Study/Environmental Impact Statement

- 1. (May 20, 1993 FS/EIS Comment no. 1) MDNR agrees with the response to this comment; however, we still object to the language on page ES-2 and elsewhere that states "A contaminated area at the St. Louis site must be definitely attributed to MED/AEC uranium processing activities to be within the scope of remedial action." This language appears to be inconsistent with the Federal Facilities Agreement. "Reasonably attributed" instead of "definitely attributed" would be acceptable.

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2. (Page 2-69, Section 2.3) The first full paragraph states that the EPA's target carcinogenic risk is 1 in 10,000. MDNR believes this should be 1 in 1,000,000.
3. (May 20, 1993 FS/EIS Comment no. 4) The MDNR agrees that it is not practical to remediate the shallow ground water at the SLAPS area. This necessitates that the wastes be excavated and placed in a lined facility since the shallow ground water could be a recharge source for the aquifer.
4. (May 20, 1993 FS/EIS Comment nos. 8, 16, and 35, and page A-22 of revised FS/EIS) The MDNR reiterates its position that the EPA ground water classification does not supersede the MWQS (Missouri Water Quality Standards). We agree that the shallow ground water at the SLAPS does not meet the definition of an aquifer in the MWQS, based on quantity and not quality considerations. However, the aquifer beneath the site, which is the same ground water body, is a potential drinking water source, and the MWQS apply at the point that sufficient ground water is available as defined in the MWQS. The degree of interconnection is a significant issue addressed in comments on the Site Suitability Study.

The application of the State Water Quality Standards must be applied in this context. For water that only moves through the shallow zone and discharges to Coldwater Creek, the MWQS apply at the point that the stream becomes classified, which is 5.5 miles upstream from its mouth. The Missouri Drinking Water Regulations and the Safe Drinking Water Act are applicable at the point that the ground water meets the definition of an aquifer.

The MDNR disagrees with the third aspect of the response to Comment no. 35. Since the shallow ground water is interconnected to the aquifer, it is defined as "waters of the state."

5. (May 20, 1993 Comment no. 12) The fourth bullet in the response states that "no areas have been identified based on history..." referring to organic and non-radioactive inorganic constituents. Has DOE conclusively evaluated the industrial processes, metal constituents, and potential chemical usage? We believe that the metal constituents are reasonably correlated to the original wastes. The MDNR requests that this information be made part of the formal documentation.

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6. (May 20, 1993 Comment no. 14) The MDNR believes that a more definitive statement should be made than first sentence in the third paragraph of Section 2.3.3 (page 2-97 of revised FS). Upgradient source of ground water contamination will become extremely important if contamination of the aquifer at SLAPS is determined. If a definitive statement cannot be made, additional ground water monitoring is needed to determine the full rate and extent of contamination at the SLAPS.
7. (May 20, 1993 Comment no. 15) Although not used as a basis for remediation the reference to the cancer rate still needs to be clarified. If the reference remains in the FS/EIS, it should be stated that the risk posed by the St. Louis Site along with the multitude of other risks as well as other factors altogether cause the one in three cancer rate.
8. (May 20, 1993 Comment no. 17) The majority of this comment and response was further addressed in Comment no. 4 above. However, the MDNR would like to address the last sentence in the response that states "no contamination of a potential drinking water source is occurring." The monitoring of the aquifer at the SLAPS should be a continuous activity, regardless of the timing of the remedial action for the St. Louis Site.
9. (May 20, 1993 Comment no. 18) The MDNR disagrees with the conclusion of the Site Suitability Study on the unit 3 clays. More comments are contained below under the that section.
10. (May 20, 1993 Comment no. 22) Response is inadequate in that it does not address the need for legally binding agreements, between MDNR (or EPA) and DOE, and between DOE and the property owner. We believe that the DOE should do a true risk and cost analysis of using institutional controls and incorporate this into the decision making framework.
11. (May 20, 1993 Comment no. 23) Further comment on this issue is contained in comments on the Site Suitability Study.
12. (May 20, 1993 Comment nos. 31, 33 and 34) See other comments regarding institutional controls at general comment 2 and FS/EIS comment 10 above.
13. a. (May 20, 1993 Comment no. 39) This comment pertains to whether the Missouri Hazardous Waste Law and Regulations are an ARAR. The DOE response does not sufficiently justify why this Law and Regulation are not relevant and

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appropriate. We agree that the FUSRAP St. Louis Site wastes as a whole do not meet the definition of solid or hazardous waste according to 40 CFR Part 261; therefore, the Missouri Hazardous Waste Law and Regulations are not applicable. However, several samples had previously failed the EP Toxicity Test for lead, isolated samples failed the TCLP Test for selenium and lead, and barium, lead, selenium, and chromium are prevalent in the wastes based on total metals analyses. Organic constituents are also found at low levels. The wastes are sufficiently similar to hazardous waste in non-radiological and radionuclide constituents to necessitate a declaration that the disposal requirements in the Missouri Hazardous Waste Law and Regulations are relevant and appropriate.

- b. (Page 2-69, Section 2.3) The MDNR disagrees with the revised language which states that RCRA is not relevant and appropriate. The Missouri Hazardous Waste Law and Regulations and the RCRA regulations incorporated therein by reference should be relevant and appropriate. The Baseline Risk Assessment shows carcinogenic risk for chemical contaminants of greater than 1 in 1,000,000 for current receptors and 1 in 10,000 for future receptors. Although not in a current aquifer used for drinking water, concentrations of metals exceed drinking water levels in ground water which is in connection with an aquifer protected for drinkingwater uses under the Missouri Water Quality Standards. This information all leads to the conclusion that reliance on predictive models alone is unacceptable. A facility that is designed with an appropriate liner and cover system is necessary.

14. (May 20, 1993 Comment no. 40) See other comments regarding ARAR's.
15. We believe that the DOE needs to address the concern that a slurry wall will cause head to build up and cause vertical migration of contaminants. At this point, we believe that complete excavation of the SLAPS and construction of a lined facility will offer more protection than consolidation and capping with a slurry wall.
16. a. The cost analysis in Appendix B should include the cost estimate under alternative 4 and 5 for a facility with a liner and cover system that meets the requirements for a hazardous waste landfill.

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- b. Alternative 3 would be more realistic if it includes the additional future cost of remediating ground water which may be necessary because contamination will migrate sooner as compared to the on-site disposal alternative in 4 and 5. It also should include the cost of not containing the material in the event that recovery is economically beneficial prior to the end of the facility life.
 - c. Alternatives 3 and 4 grossly underestimate the cost of institutional controls. This may be because the DOE is not taking responsibility for any contamination left in place beyond establishment of initial deed restrictions. Over the long term, significant administrative and field costs will be incurred.
17. We understand that the EPA is planning to promulgate cleanup requirements for radionuclides that may apply to the FUSRAP St. Louis Site. Also, the cleanup criteria proposed for this site has not been accepted at some other sites. Has the DOE done soil volume estimates for a more stringent cleanup standard scenario?

Comments on the Proposed Plan

- 1. The preferred alternative is unacceptable to MDNR. All comments on the Feasibility Study/Environmental Impact Statement apply to the alternative selection by the DOE.
- 2. (May 20, 1993 Comment no.3) MDNR requests that DOE regularly report the status of the "FUSRAP system-wide effort" as it relates to treatment feasibility at the St. Louis Site.
- 3. (May 20, 1993 Comment no. 4) What steps is the DOE taking to acquire the SLAPS site so that it can be used for the DOE preferred alternative.
- 4. Please refer to the memorandum (attached) from Mimi Garstang to Dave Bedan dated August 18, 1993

Comments on the Site Suitability Study

- 1. Please refer to the comments in the memorandum (attached) from Mimi Garstang to Dave Bedan dated August 12, 1993.
- 2. (May 20, 1993 Comment no. 4) The response to this comment on earthquake provisions references compliance with 40 CFR 258.14. This RCRA Subtitle D regulation requires design for

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earthquake if the facility is in a zone designated in USGS Report 82-1033, "Probabilistic Estimates of Maximum Acceleration and Velocity in Rock in the Contiguous United States." This report designates zones that have an expected earthquake exceeding 0.10g in rock with a return frequency of 250 years.

What is the design acceleration for a disposal facility at the SLAPS?

3. What form of uranium and radium were used to determine the distribution coefficient of borehole samples as compared with the actual form of radionuclides on the FUSRAP St. Louis site?
4. The MDNR believes that the full vertical and horizontal extent of potential contaminant transport should be modelled. This information will be used to determine if a lined facility is acceptable for location at the site.
5. Our understanding of the MULTIMED or other models is that they use a retardation coefficient calculated using the distribution coefficient and soil characteristics assuming breakthrough of fifty percent of the maximum solute concentration. This does not relate to a maximum contaminant level or other water quality standard. The DOE should address this aspect of modelling. The hazardous waste landfill site location standard in the Missouri Hazardous Waste Management Regulations must be applied looking for the first predicted breakthrough of detectable metal and radioactive contaminants.

Comments on the Evaluation of Contaminated Sediment Transport in Coldwater Creek

1. Please refer to comments in the memorandum (attached) from Neil Elfrink to Mimi Garstang dated August 12, 1993.

Comments on the Groundwater Flow and Transport Model for the Airport Area

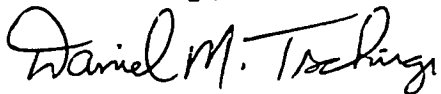
1. Please refer to comments in the memorandum (attached) from Mimi Garstang to Dave Bedan dated August 19, 1993.

Thank you for the opportunity to comment on these documents. We reserve the right to make further comments on these documents in draft form or during the public review period. We request that a

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response to all individual comments be provided with an indication of any changes that are made or these documents. Please contact me if you wish to discuss any of these comments.

Sincerely,



Daniel M. Tschirgi, P.E.
Environmental Engineer
Federal Facilities Section

DMT:al

c: Mr. Dan Wall, EPA Region VII
Mr. Daryl Roberts, MDOH

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

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MEMORANDUM

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HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

DATE: August 12, 1993

TO: Dave Bedan, Radioactive Waste Coordinator,
Administration Program, DEQ

FROM: Mimi Garstang, Waste Management Unit Chief,
Environmental Geology Section, DGLS

SUBJECT: Site Suitability Study for the St. Louis Airport
Site; St. Louis, Mo.; FUSRAP; July, 1993; prepared
by Bechtel National, Inc.

The above mentioned document has been reviewed by DGLS. The interpretation of some of the data in this July, 1993 revision of the Site Suitability Study, however, has changed from the previous report issued in May, 1993. The interpretation of the data in the original report (May, 1993) seems to be more realistic.

Many of the original issues and concerns relative to the suitability still remain outstanding. The cell is sited on top of rubble material that at a minimum will require consolidation or possibly added strength to bear the load of the disposal facility. A portion of the disposal facility is located within the 100-year flood plain. The high water table at the site will remain in contact with contaminated material in some of the alternatives presented. A buffer to surround the site is not mentioned and a continuous aquitard is not present beneath the site. It is not going to be possible to meet Missouri hazardous waste landfill siting criteria at the SLAPS site. At this time DGLS does not necessarily feel that unacceptable risks will be created at the SLAPS site if proper engineering practices are implemented and natural safeguards are utilized in the design and location of a disposal facility.

Most of the specific comments to be presented below are relative to the data as presented in the report and the interpretation thereof.

Specific comments are as follows:

1. P. 14, Section 2.3 - The author again reports the SLAPS site is situated in a "tectonically quiet" area. The author does go on to report the earthquake activity known to occur in the vicinity of St. Louis and adequately addresses the risk

associated with such a region.

2. P. 31, Figure 2-1 - The stratigraphic column presented of the St. Louis region was prepared well with some of the most recent classifications recognized by the State. A few minor academic changes remain to be corrected. I am not sure about what is meant by the Fern Glen Formation (Chouteau Limestone). These are two completely different formations and it is doubtful whether the Chouteau is even present in the SLAPS area. The Fern Glen Formation is Osagean in age and the Chouteau Limestone is Kinderhookian in age. The Decorah "Formation" and Platin "Limestone" should be renamed.

3. P. 51, Section 3.1 - The description of Unit 6-the Ste. Genevieve Limestone as based on data from the site may not be totally accurate as a good description of this unit. There are only 2 holes on site that even encounter a portion of the limestone. They are both on the eastern side of the site. They penetrate the limestone by only 15 feet, therefore, the void space in the limestone may be questionable.

Normally, a clay-rich conglomerate is found in the basal Pennsylvanian in the St. Louis area.

4. P. 52 - Units 4 and 3T and 3B contain considerable amounts of sand. Unit 4 contains up to 77% sand and analysis of units 3B and 3T contained several samples with 30% sand or greater. The variable sand content is probably a major factor in the range in permeabilities for these units.

Horizontal in-situ permeabilities for units 3T and 3B range from 10^{-4} to 10^{-6} . It is recommended that additional insitu testing be done that evaluates both horizontal and vertical permeabilities. The insitu testing done for unit 3M showed a permeability of 3.1×10^{-5} while laboratory tests indicated a permeability of 5.5×10^{-8} . This discrepancy is too large for comparison. Tests should be repeated-especially for field permeabilities.

5. P. 53 - Unit 1 should be divided into subunits so it will be clear where rubble zones exist vs. the portion of this unit that is undisturbed topsoil.

6. P. 56 - The text states that "the disposal facility overlies some of the thickest areas of fill material." Unit 1 is likely to be the most heterogeneous unit on site and areas of rubble fill should be delineated from natural fill. It seems reasonable that thick rubble fill areas will be the most difficult areas on which to construct the disposal facility. The strength of the rubble fill will be questionable.

Please identify the buried channels referenced.

None of the 3 alternatives mentioned include removal of the

rubble material. I suggest extensive investigation (including a determination of engineering properties) of fill areas.

7. P. 58, Section 3.3

In Table 3-3 porosity and permeability data is available for Unit 5 and not for Unit 6.

8. P. 61, Section 3.4

The discussion about the various soil units and the "geometric mean distribution ratios" is not clear to this reviewer. It seems inconsistent with the conclusions presented that unit with the highest clay content has the lowest geometric mean distribution ratio. The two units with the highest organic contents have the highest geometric mean distribution ratios. It appears that the organics are a major controlling factor in the uranium distribution. Could this be explained further?

It should be understood that the bonds between the radionuclides and the clay-rich units are not chemical bonds and they will not be totally stable over the long half-life of the radionuclides present.

9. Figure 3-5, 3-6 and 3-7

There seems to be very little data from which to draw the lower portion of the cross-section between wells B53W10D and B53614 (approximately 1500 feet). There seems to be little data for control of where the shale bedrock and limestone bedrock converge, or how flat lying the Mississippian bedrock surface might be.

10. Figure 3-10

The legend indicates where the yellow color is present, 3M is absent. It also states that where there is a number beneath the boring number, it represents a combined thickness of Units 3M and 3B. There are numbers beneath borings where the yellow area is outlined.

11. Table 3-1

From all the data in the report on the unconsolidated materials at SLAPS, it does not seem apparent that unit 3B should be considered part of the aquitard. The Atterburg limits, permeability, etc. all seem to indicate it's characteristics similar to Unit 3T and not unit 3M. It is DGLS' contention that there is not a continuous aquitard beneath the SLAPS site.

12. P. 86, Table 3-2

Will the additional contaminated virgin soil that is not under the boundary of the proposed disposal cell also be excavated and put in cell?

13. P. 87, Table 3-3

What exactly is meant by "geometric mean permeability"?

It appears that the field testing done on most of the units is

minimal (1,2 or 3 samples). Only the testing done on unit 3M (1 sample) combined both horizontal and vertical permeabilities. All the other tests indicate only horizontal permeabilities. Additional field analysis must be done before DGLS can feel comfortable that these results are indicative of true field permeabilities. Why was Unit 5 never tested?

14. P. 92, Section 4.2

DGLS has not seen convincing data to prove that unit 3B serves as an aquitard or that the only connection between the upper and lower units on site is from recharge offsite. It seems more reasonable (from comparing SWL, soil unit characteristics, and water chemistry data) that it is probable that recharge is occurring from the ground surface to the Mississippian age limestone on site.

15. P. 94

The sentence at the end of the first paragraph is unclear.

I am not sure that the static water levels of the lower aquifer as presented in Figure 4-6 are acceptable to use as comparison to each other. Some of the deeper wells compared are screened, some in the shale, some in residuum, etc. This interpretation has shown both upward and downward flow gradients across the site. Only static water levels from the same unit should be utilized to produce a potentiometric surface. The validity of the map produced in Figure 4-5 (lower groundwater surface) is also questionable.

16. P. 101

It will be critical for MDNR to review the COE plan to control flooding of Coldwater Creek in light of the final remediation decision made at the SLAPS site. Modifications of Coldwater Creek could drastically affect the effectiveness of many of the proposed alternatives for the site.

17. P. 102, Section 4.4.5

Please provide the site specific assumptions made to plug into the MUSLE.

18. P. 119, Table 4-1

It would be helpful to know which unit each of these wells were monitoring when trying to compare geochemical data. Can any conclusions be drawn from this data as presented?

19. P. 121 and 122

The contaminant transport model does not address the vertical migration of contaminants; only the horizontal. The pumping only appears to influence horizontal movement. I am not sure it is appropriate to ignore the vertical factor at this time.

The discussions on contaminant movement through the vadose zone was done with no permeability data on Unit 1. All calculations were made on assumptions. Unit 1 needs additional testing.

performed in order to predict infiltration rates. I would think transport to the water table could be fast where rubble zones are present. It appears inaccurate to say it will take 1000 years for radionuclides to reach the groundwater when they are already there.

The actual permeabilities of units 3M and 3B are questionable. Field data is quite different than laboratory and only one field test was done on Unit 3M. DGLS still the existence of a continuous aquitard across the site. It appears that all groundwater on site is interconnected, however, the potential for contaminants to reach the regional aquifer are not expected to be high in the short term.

20. P. 125, Section 5.1.4

Please provide the assumptions made in developing the HELP Model.

21. P. 128, 5.2.2

It sounds as if the 300 gallons of grout lost in B53G13 was lost above the limestone or in the upper few feet. A void in the unconsolidated material would be a significant feature. If a void is not present, a very permeable zone exists above bedrock. Would this be Unit 4? The data resulting from the 29 to 30 borings at the site are borings completed above the limestone which is the unit where caves would be expected if they are present beneath the site.

22. P. 138, Section 6.0

DGLS has not seen data to convince us of a continuous aquitard or the separation of aquifers at the site. Surface water drains from east to west over most of the site with a northerly component on the east central portion of the site.

23. P. A-8, Table A-2

Field permeability testing should be done that evaluates both horizontal and vertical permeability.

MG/dsb

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 MEMORANDUM

HAZARDOUS WASTE PROGRAM
 MISSOURI DEPARTMENT OF
 NATURAL RESOURCES

DATE: August 19, 1993

TO: Dave Bedan, Radioactive Waste Coordinator,
 Administration Program, DEQ

FROM: Mimi Garstang, Waste Management Unit Chief,
 Environmental Geology Section, DGLS

SUBJECT: Groundwater Flow and Transport Model For the
 Airport Area; St. Louis, Missouri, in support
 of FUSRAP; July, 1993

The above mentioned document has been reviewed by DGLS. We have numerous questions about some of the figures presented and the basic assumptions made on site conditions that were used in the model.

Specific comments are as follows:

An explanation should be provided for Figure 2 where saturated thickness are contoured. Does this represent the thickness of materials from the water table to the top of the 3M unit or top of bedrock? Data points should be presented. Why are certain areas considerably thinner than others?

The effectiveness of Units 3B and 3M serving as an aquitard has not been proven. Unit 3B is not plastic and often contains significant amounts of sand. It appears to exhibit moderate permeabilities and would not be considered an aquitard. How will the model be affected if an aquitard does not exist at the site?

Why is only the horizontal component of flow being considered? Why would the soil source area not be considered a continual source of contamination?

A map should be included with Table 2 to locate these groundwater sampling points.

From what depth were the pumping wells producing in the model simulations?

Has Coldwater Creek been gauged near the site to determine an average discharge of 41 cfs? Is it truly groundwater contributing 70% of the stream discharge or surface water?

It might be reasonable to calibrate the contaminant transport

model (to test the validity of the input parameters) by starting with a point source and seeing if it will show the present day location of the plume.

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HAZARDOUS WASTE PROGRAM
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DATE: August 12, 1993

TO: Mimi Garstang, Environmental Geology Section, DGLS

FROM: Neil Elfrink, Environmental Geology Section, DGLS

SUBJECT: Evaluation of Contaminated Sediment Transport in Coldwater Creek, St. Louis, Mo., FUSRAP July 1993; by Science Applications International Corporation 14062 Denver West Parkway, Golden, CO 80401

This report contains some good graphics and shows that the sediments in the Coldwater Creek channel are slowly moving toward the Missouri River. One important graphic that is missing from the draft is a longitudinal profile of Coldwater Creek. A longitudinal profile would show that the valley of Coldwater Creek Valley is still developing as it adjusts to a new base level-the Missouri River. The current profile reflects the relatively recent influence of a Pleistocene lake. This lake no longer exists, allowing Coldwater Creek to erode downward. The situation is depicted in the enclosed diagram taken from Earth, 1972, by Frank Press and Raymond Siever. In the case of Coldwater Creek, regional base level is the Missouri River instead of the ocean. The models presented in this draft are based on the assumption that the Coldwater Creek channel is stable. The stream profile suggest this assumption is incorrect.

Another potentially important issue not addressed in this document is the mobilization of radionuclides by organic molecules and hydroxides. This draft assumes all contamination escapes the sites attached to fine-grained sediment.

3.4 EROSION AND SEDIMENTATION, P. 15, first paragraph

Coldwater Creek has yet to adjust its stream profile to changes that have occurred in the geologically recent past. The biggest change is the deposition of fine-grained lake deposits during the Pleistocene. The first paragraph mentions that Coldwater Creek is "very steep" above its confluence with the Missouri; however, the full implications of this non-equilibrium profile are not fully appreciated throughout the document. The "higher sediment carrying capacity" attributed to sediment deficiency is probably more a result of the stream trying to reach a profile that is in equilibrium. The stream is degrading and moving sediment downstream because base level has been lowered, not because "relatively clean water" is coming from under the airport;

although sediment deficiency is a factor.

4. CONCEPTUAL MODEL, P. 17

The conceptual model does not even mention that the stream is in the process of adjusting its bed to a new profile. The numerical/emperical models chosen are for a graded stream with a concave-upward profile.

4.1 GEOMORPHOLOGY OF THE CREEK, p. 17

The statement that Coldwater Creek is a "relatively stable stream" may be true on a human time scale of a few hundred years, but on a geologic time scale the stream is relatively unstable. The current concavity of the stream profile will be adjusted to the new regional base level. The bed of Coldwater Creek will be eroded to a new profile, a profile that is steeper on the upgradient end of the watershed.

6.4 DREDGING, p. 32

The prediction of increased degradation downstream resulting from dredging is indeed correct. But if the stream will "re-equilibrate" to a small amount of dredging, why does it not "re-equilibrate" to the lower base level present since the Pleistocene lake disappeared. This new base level is the Missouri River.

NME/dsb

River profile adjusted to lake (local) base level

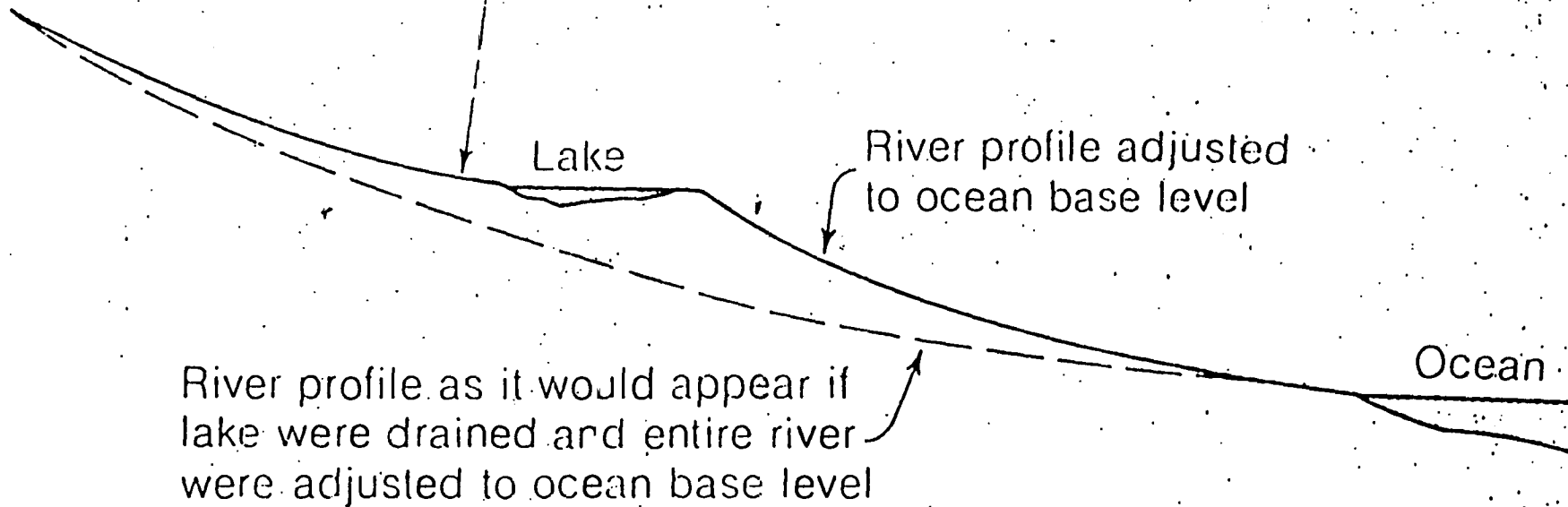


Figure 9-25

Regional and local base level as illustrated by a river flowing into a lake and from the lake into the ocean. In each river segment, the longitudinal profile adjusts to the lowest level it can reach. The lake may be a natural one or an artificial reservoir behind a dam. If the lake were drained and the river allowed to erode downward, the riverbed would adjust eventually to a single concave-upward profile.

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MEMORANDUM

HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

DATE: August 18, 1993

TO: Dave Bedan, Radioactive Waste Coordinator,
Administration Program, DEQ

FROM: Mimi Garstang, *Mimi Garstang* Waste Management Unit Chief,
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SUBJECT: Comments on Proposed Plan for the St. Louis
Site: St. Louis, Mo; FUSRAP; July, 1993

The Proposed Plan for the St. Louis Site, dated July 1993, has been reviewed by DGLS. Minimal comments have been presented in the following pages. None of the alternatives presented meet Missouri Hazardous Waste Siting Criteria. Therefore, those comparisons have been omitted from comments. DGLS feels that clarification and/or modifications of the alternatives as presented will be required before decisions on site remediation can be made.

1. P. 10

The last 2 sentences in the bullet on groundwater contamination are unclear. They seem to say Coldwater Creek will dilute contamination below regulatory levels and any risk would be eliminated if Coldwater Creek were used as a drinking water source. Is that accurate?

2. P. 13

Not all groundwater in the area is of poor quality. The Mississippian aquifer is expected to provide good quality drinking water beneath the SLAPS site.

3. P. 14 (See comment above.)

4. P. 18

The details on the slurry wall at the SLAPS site will need to be provided before it can be determined whether or not such a technology would be applicable to the site. Most slurry wall installations require the pumping of groundwater from behind them so pressures do not build up and/or other undesirable groundwater migration pathways aren't created. A major concern would be the possibility of driving the contamination deeper.

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5. P. 15-20

It does not appear that any of the alternatives discuss the fate of the contaminated groundwater at HISS or SLDS. Will they be addressed in remediation?

6. P. 21

A continuous aquitard does not exist beneath the SLAPS site to tie the slurry wall into. See comments on Site Suitability Study.

7. P. 30

The example of comparing SLAPS to Missouri Electric Works, Wheeling Disposal and/or Conservation Chemical is not relevant. These sites do not compare to SLAPS and should not be referenced.

MG/mjh

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Formerly Utilized Sites Remedial Action Program (FUSRAP)

ADMINISTRATIVE RECORD

for the St. Louis Site, Missouri



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