ENVIRONMENTAL ASSESSMENT

Alton to Gale Organized Levee Districts, Illinois and Missouri (Continuing, Deficiency Corrections) Letter Report

APPENDIX A

Pertinent Correspondence

CONTENTS:

A. Coordination with US Fish and Wildlife service dated 7 August 2008 Regarding species listed or proposed to be listed in the project area EA-A-3

B. Emails between USACE and Illinois Department of Natural Resources dated 7, 8, and 19 January 2010 regarding Illinois Natural areas and threatened/endangered species in or near the project area..... EA-A-8

C. Letter from the department of Agriculture Bureau of Land and Water Resources dated 26 may 2010 concurring the project complies with the Illinois Farmland Preservation Act. EA-A-9

D. Letter from Missouri Department of Natural Resources State Historic Preservation Office dated 1 June 2010 concurring with project as written .. EA-A-10

E. Email from US. EPA dated 2 June 2010 concurring with the projects as written..... EA-A-11

F. Letter from the Illinois Department of Natural Resources dated 7 June 2010 concurring that the proposed levee repairs can be implemented with no appreciable adverse impacts to [Illinois] biological resources EA-A-12

G. Letter from the US Fish and Wildlife Service dated 21 June 2010 concurring with the Finding of No Significant Impact on the update Environmental Assessment..... EA-A-13

H. Email correspondence between USACE and Mike Sabo dated 15 July 2010 concerning the lack of adequate information in the EA to support the use of fly ash in levee repairs..... EA-A-16

I. Email correspondence between USACE and Mike Sabo dated 19 July 2010 regarding risks associated with ingestion of fly ash by fauna EA-A-19

J. Letter from the US EPA Region 5 dated 18 August 2010 providing information on current considerations in the use of fly ash..... EA-A-21

K. Email from Kathy Andria dated 21 June 2010 requesting an extension of the public comment period for the project as well as environmental concerns over the use of fly ash for levee stabilization EA-A-23

L. Response letter to Kathy Andria from USACE EA-A-29

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Marion Illinois Suboffice (ES)
8588 Route 148
Marion, IL 62959
(618) 997-3344
August 7, 2008

Kenneth M. Cook, PM-E
U.S. Army Corps of Engineers
St. Louis District
1222 Spruce Street
St. Louis, Missouri 63103-2833

Dear Mr. Cook:

This is in response to your request for a current list of threatened and endangered species that may be present in the Alton-to-Gale Levee Project. The proposed project areas are located in the Alton-to-Gale Organized Levee Districts in Madison, St. Clair, Monroe, Randolph, Jackson, Union, and Alexander Counties, Illinois. The proposed project includes correcting a deficiency in the construction of levees within the Levee Districts. These comments are provided under the authority of and in accordance with the provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.); the Endangered Species Act of 1973, as amended; and, the National Environmental Policy Act.

To facilitate compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, Federal agencies are required to obtain from the Fish and Wildlife Service (Service) information concerning any species, listed or proposed to be listed, which may be present in the area of proposed action. Therefore, we are furnishing you the following list of species which have ranges that include the project area and have included background information for each species in an attachment:

Classification	Common Name (Scientific Name)	Habitat
Endangered	Gray bat (*Myotis grisescens*)	Caves; feeding-rivers/ reservoirs adjacent to forests
Endangered	Indiana bat (*Myotis sodalis*)	Caves, mines; small stream corridors with well developed riparian woods; upland and bottomland forests

Classification	Common Name (Scientific Name)	Habitat
Endangered	Least tern (*Sterna antillarum*)	Bare alluvial and dredge spoil islands
Endangered	Pallid sturgeon (*Scaphirhynchus albus*)	Rivers
Endangered	Illinois cave amphipod (*Gammarus acherondytes*)	Karst caves & streams
Threatened	Decurrent false aster (*Boltonia decurrens*)	Disturbed alluvial soils
Candidate	Sheepnose (*Plethobasus cyphyus*)	Rivers

There is no designated critical habitat in the project area at this time.

We do not have any comments on the scope of this project at this time. Thank you for the opportunity to comment on the scope of this project and provide information concerning threatened and endangered species. We look forward to reviewing the Environmental Assessment. If you have any questions, please contact Matt Mangan of my staff at (618) 997-3344, ext. 345.

Sincerely,

Joyce A. Collins
Assistant Field Supervisor

cc: IDNR (Schanzle)
FWS (Cail, Ellis, Maybery, Westphall)

FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES INFORMATION FOR ALEXANDER, JACKSON, MADISON, MONROE, RANDOLPH, ST. CLAIR, AND UNION COUNTIES, ILLINOIS

The **gray bat** (*Myotis grisecens*) is listed as endangered and occurs in several Illinois and Missouri counties where it inhabits caves both during summer and winter. This species forages over rivers and reservoirs adjacent to forests. A search for this species should be made prior to any cave impacting activity.

The endangered **Indiana bat** (*Myotis sodalis*) has been noted as occurring in several Illinois and Missouri counties. Indiana bats are considered to potentially occur in any area with forested habitat. Indiana bats migrate seasonally between winter hibernacula and summer roosting habitats. Winter hibernacula include caves and abandoned mines. Females emerge from hibernation in late March or early April to migrate to summer roosts. Females form nursery colonies under the loose bark of trees (dead or alive) and/or in cavities, where each female gives birth to a single young in June or early July. A maternity colony may include from one to 100 individuals. A single colony may utilize a number of roost trees during the summer, typically a primary roost tree and several alternates. Some males remain in the area near the winter hibernacula during the summer months, but others disperse throughout the range of the species and roost individually or in small numbers in the same types of trees as females. The species or size of tree does not appear to influence whether Indiana bats utilize a tree for roosting provided the appropriate bark structure is present. However, the use of a particular tree does appear to be influenced by weather conditions, such as temperature and precipitation.

During the summer, Indiana bats frequent the corridors of small streams with well-developed riparian woods, as well as mature bottomland and upland forests. It forages for insects along stream corridors, within the canopy of floodplain and upland forests, over clearings with early successional vegetation (old fields), along the borders of crop lands, along wooded fence rows, and over farm ponds and in pastures. It has been shown that the foraging range for the bats varies by season, age and sex and ranges up to 81 acres (33 ha). To avoid impacting the species, tree clearing activities should not occur during the period of April 1 to September 30. If a proposed action occurs within a 5-mile radius of a winter hibernacula, tree clearing should be prohibited from April 1 to November 15. If it is necessary to clear trees during this time frame, mist net surveys may be necessary to determine if Indiana bats are present. A search for this species should be made prior to cave impacting activities.

The **least tern** (*Sterna antillarum*) is listed as endangered and occurs in several Illinois counties along the Mississippi and Ohio Rivers. It nests on bare alluvial or dredge spoil islands and sand/gravel bars in or adjacent to rivers, lakes, gravel pits and powerplant cooling ponds. It nests in colonies with other least terns and sometimes with the piping plover. This species forages in shallow water areas along the river and in backwater areas, such as side channels and sloughs. Foraging habitat must be located in close proximity to nesting habitat.

The endangered **pallid sturgeon** (*Scaphirhynchus* albus) is found in the Mississippi River downstream of Melvin Price Locks and Dam. Pallid sturgeon are adapted to large rivers with extensive micro-habitat diversity, turbid water, braided channels, irregular flows and flood cycles. Little is known of its micro-habitat preferences, however, it is suspected that sand/gravel bars and the mouths of major tributaries may be utilized for spawning. This species feeds on aquatic invertebrates and small fish.

The **Illinois cave amphipod** (*Gammarus acherondytes*) is listed as endangered in Monroe and St. Clair Counties, Illinois. It is currently known to occur in only a few cave streams of the Illinois sinkhole plain in southwestern Illinois. The contamination of groundwater is probably the greatest threat to this species.

The **decurrent false aster** (*Boltonia decurrens*) is listed as threatened and is known to occur in several Illinois counties in the floodplain of the Illinois and Mississippi River. It is considered to potentially occur in any county bordering the Illinois River and Jersey, Madison and St. Clair Counties bordering the Mississippi River. It occupies disturbed alluvial soils in the floodplains of these rivers. Federal regulations prohibit any commercial activity involving this species or the destruction, malicious damage or removal of this species from Federal land or any other lands in knowing violation of State law or regulation, including State criminal trespass law.

The **Sheepnose** (*Plethobasus cyphyus)* is listed as a candidate species and occurs in rivers. This species inhabits gravel or mixed sand and gravel habitats in medium to large rivers.

Cook, Kenneth M MVS

From: Schanzle, Bob [Bob.Schanzle@Illinois.gov]
Sent: Tuesday, January 19, 2010 2:35 PM
To: Lowe, Marilyn H MVS; Cook, Kenneth M MVS
Cc: Kieninger, Tara; Ballard, Scott; Matthew_Mangan@fws.gov
Subject: RE: Alton-Gale Levee Repairs

Follow Up Flag: Follow up
Flag Status: Green

Attachments: Alton to Gale.wpd; Alton to Gale.doc

Alton to Gale.wpd (8 KB) Alton to Gale.doc (8 KB)

Marilyn and Ken:

Attached for your information is a listing of the identified Illinois natural areas and threatened/endangered species occurring in close proximity to the various levee repair sites between Alton and Gale. I hope this proves useful. Please contact me by phone or e-mail if you have questions or I can be of any other assistance.

Sincerely,

Robert W. Schanzle
Permit Program Manager
IDNR, Office of Realty and Environmental Planning

Ph: 217-785-4863
bob.schanzle@illinois.gov

-----Original Message-----
From: Lowe, Marilyn H MVS [mailto:Marilyn.H.Lowe@usace.army.mil]
Sent: Friday, January 08, 2010 7:40 AM
To: Schanzle, Bob
Cc: Cook, Kenneth M MVS
Subject: FW: Alton-Gale Levee Repairs

Bob,

I am the project manager for the Alton to Gale Project. Ken is going to be out of the office for the next week or two, so he asked me to respond to your questions to ensure we addressed your concerns and provided you with the information you are looking for while he is out.

The recommended plan that we are addressing is using the lime/fly ash injection that is discussed in the draft EA. This process is quite different than was used in the previous levee repairs. In the past, we utilized a lime stabilization process that required considerable space to treat the clay material. In the new recommended approach, all work can be accomplished from the top and slopes of the levee to inject the lime/fly ash material. There is however a mobilization area required to mix the lime/fly ash slurry. It is anticipated the project (within each levee district) will require a 2-acre temporary construction easement just off of the levee to complete the lime/fly-ash injection process, but it is likely that process can be accomplished on levee right-of-way using a track-mounted flat bed vehicle.

Also, attached are project maps for each area to be repaired.

Please let me know if you need additional information.

Thanks,
Marilyn

Marilyn H. Lowe
Project Manager, PM-F
USACE, St. Louis District
314-331-8618

-----Original Message-----
From: Cook, Kenneth M MVS
Sent: Thursday, January 07, 2010 11:57 AM
To: Lowe, Marilyn H MVS
Subject: FW: Alton-Gale Levee Repairs

-----Original Message-----
From: Schanzle, Bob [mailto:Bob.Schanzle@Illinois.gov]
Sent: Thursday, January 07, 2010 9:30 AM
To: Cook, Kenneth M MVS
Cc: matthew_mangan@fws.gov; Ballard, Scott
Subject: Alton-Gale Levee Repairs

Ken,

As long as the repair activities are restricted to the existing levee footprint, significant adverse impacts to listed species may be unlikely. However, I seem to recall a couple of instances during the emergency repair reviews last year where identified E/T habitat came right up to the toe of the levee, and there's always the potential that bald eagles, Mississippi kites, etc. might nest adjacent to a repair site and be subject to disturbance. Also, section 3.8.3 of your draft EA states that the placement of access roads, equipment staging areas, and debris collection areas hasn't yet been determined, so there could be a possibility of impacts there. The bottom line is that we can't say this early in the process that no adverse impacts will occur.

Would it be possible to get site-specific aerials and/or maps of the various sites where repairs are proposed? These would allow us to determine fairly quickly if there are any occurrence records located in close proximity and if there's any cause for concern. Beyond that, if the final EA states that all work will be performed from within the levee footprint and includes criteria for the placement of access roads, staging areas, etc. to prevent habitat disturbances, there should be no major problems. Time restrictions to protect nesting animals might also be beneficial.

Regards, Bob S.

Robert W. Schanzle
Permit Program Manager
IDNR, Office of Realty and Environmental Planning

Ph: 217-785-4863
bob.schanzle@illinois.gov

Illinois Department of Agriculture

Pat Quinn, Governor
Thomas E. Jennings, Director

Bureau of Land and Water Resources

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May 26, 2010

Mr. Ken Cook
Department of the Army
St. Louis District, Corps of Engineers
Environmental Branch PM-E, Cook
Robert A. Young Building, 1222 Spruce Street
St. Louis, Missouri 63103-2833

Re: Environmental Assessment and Draft Finding of No Significant Impact
Levee Repairs P.L. 84-99: Alton-to-Gale Organized Drainage and Levee Districts
Alexander, Jackson, Madison, Monroe, Randolph, St. Clair and Union Counties, Illinois and Perry County, Missouri

Dear Mr. Cook:

The Illinois Department of Agriculture (IDOA) has examined the above-referenced project for its potential impact to agricultural land in order to determine its compliance with the Illinois Farmland Preservation Act (505 ILCS 75/1 et seq.). Our analysis also relates to the federal Farmland Protection Policy Act (7 USC 4201 et seq.) that specifies federal actions affecting farmland conversion shall be consistent with state and local programs to protect farmland.

The Alton-to-Gale Drainage and Levee Districts (DLDs) are a combination of 17 federal levees located in Alexander, Jackson, Madison, Monroe, Randolph, St. Clair and Union Counties in Illinois and Perry County, Missouri. The Corps of Engineers proposes to repair multiple levee slides on the Alton to Gale DLDs levees to the federal DLD pre-disaster level of protection. In Districts where there are existing slides (Grand Tower and Degognia DLDs – presently only 5 slides), the slides will need to be repaired before any line/fly ash injection takes place.

The repairs to the Alton to Gale Organized DLDs (11 addressed in this Environmental Assessment) will be made by injecting a mixture of lime and fly ash slurry at regular intervals to a depth of 10 feet to stabilize the highly plastic clays used to construct the original levees. According to the U.S. Army Corps of Engineers' Environmental Assessment with Draft Finding of No Significant Impact, all construction repairs will be performed within the footprint of the existing levees or levee right-of-way and the levees restored to pre-flood levee grades, cross sections and alignments.

Because the levee repair project will not impact agricultural land, the IDOA has determined the project complies with the Illinois Farmland Preservation Act.

Sincerely,

Steven D. Chard

Steven D. Chard, Acting Chief
Bureau of Land and Water Resources

SDC:JL

cc: Agency Project File

CULTURAL RESOURCE ASSESSMENT
Section 106 Review

CONTACT PERSON/ADDRESS

Ken Cook
Environmental Analysis Branch
Corps of Engineers, St. Louis District
1222 Spruce Street
St. Louis, Missouri 63103-2833

C:

Joe Cothern, EPA

PROJECT:

East Corps Drainage and Levee District, Alton to Gale Organized Levee District Repair

FEDERAL AGENCY

COE

COUNTY:

PERRY

The State Historic Preservation Office has reviewed the information submitted on the above referenced project. Based on this review, we have made the following determination:

[ ] After review of initial submission, the project area has a low potential for the occurrence of cultural resources. A cultural resource survey, therefore, is not warranted.

[X] Adequate documentation has been provided (36 CFR Section 800.11). There will be "no historic properties affected" by the current project.

[ ] An adequate cultural resource survey of the project area has been previously conducted. It has been determined that for the proposed undertaking there will be "no historic properties affected".

For the above checked reason, the State Historic Preservation Office has no objection to the initiation of project activities. PLEASE BE ADVISED THAT, IF THE CURRENT PROJECT AREA OR SCOPE OF WORK ARE CHANGED, A BORROW AREA IS INCLUDED IN THE PROJECT, OR CULTURAL MATERIALS ARE ENCOUNTERED DURING CONSTRUCTION, APPROPRIATE INFORMATION MUST BE PROVIDED TO THIS OFFICE FOR FURTHER REVIEW AND COMMENT. Please retain this documentation as evidence of compliance with Section 106 of the National Historic Preservation Act, as amended.

By: Mark A. Miles — **June 1, 2010**
Mark A. Miles, Deputy State Historic Preservation Officer — **Date**

MISSOURI DEPARTMENT OF NATURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE
P.O. Box 176, Jefferson City, Missouri 65102
For additional information, please contact Judith Deel, (573) 751-7862. Please be sure to refer to the project number: 009-PY-10

Cook, Kenneth M MVS

From: Kowal.Kathleen@epamail.epa.gov
Sent: Wednesday, June 02, 2010 10:03 AM
To: Cook, Kenneth M MVS
Subject: Proposed Correction of Deficiency in Levee Construction within Alton-to-Gale Organized Levee Districts, Illinois and Missouri

Categories: Alton Gale

Ken,
After reviewing the May 17, 2010 draft EA for the above-mentioned project, EPA Regions 5 and 7 have no comments to offer on the proposed project. We appreciate the opportunity to review and comment on this project.
Thank you,
Kathy

Kathleen R. Kowal
Life Scientist
NEPA Implementation Section
Office of Science, Ecosystems & Communities U.S. Environmental Protection Agency
77 West Jackson Blvd.
Mailcode: E-19J
Chicago, IL 60604-3590
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Illinois Department of
Natural Resources
One Natural Resources Way Springfield, Illinois 62702-1271
http://dnr.state.il.us

Pat Quinn, Governor
Marc Miller, Director

June 7, 2010

Thomas M. Keevin, Ph.D.
Chief, Environmental Branch
St. Louis District, Corps of Engineers
1222 Spruce Street
St. Louis, Missouri 63103-2833

Dear Dr. Keevin:

This responds to your letter of May 17, 2010 transmitting an Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the *Alton to Gale Organized Levee Districts, Illinois and Missouri (Continuing, Deficiency Corrections) Letter Report.* The EA describes proposed levee repairs at several locations within the drainage and levee districts and analyzes their likely environmental impacts.

By electronic mailing dated January 19, 2010 the Department provided your agency with a site by site listing of Illinois threatened/endangered species and natural areas in the vicinity of the various work sites. The list is included in the EA on pages EA-B-3 and EA-B-4. A note accompanying the list indicated that "...if the final EA states that all work will be performed from within the levee footprint and includes criteria for the placement of access roads, staging areas, etc. to prevent habitat disturbance...," the Department would not expect the levee repairs to have any significant environmental impacts. While it is indicated on page EA-10 that the location of some project features (i.e. staging areas) is not known," page EA-20 states that "Placement and construction of access roads, staging areas etc., would be coordinated with the Illinois Department of Natural Resources and the Missouri Department of Conservation (in the case of the Boise Brule D&LD) to assure minimal adverse impacts..."

Subject to the satisfactory resolution of any currently unforeseen issues arising from access and staging locations, the Department believes the proposed levee repairs can be implemented with no appreciable adverse impacts to biological resources. Therefore, we concur with the Finding of No Significant Impact.

Sincerely,

Robert W. Schanzle

Robert W. Schanzle
Permit Program Manager
Office of Realty and Environmental Planning

RWS:rs

cc: IDNR/OWR (Diedrichsen)
MODOC (Sternburg)
USFWS (Collins)

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
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June 21, 2010

Kenneth M. Cook, PM-E
U.S. Army Corps of Engineers
St. Louis District
1222 Spruce Street
St. Louis, Missouri 63103-2833

Dear Mr. Cook:

We have received and reviewed the draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) addressing the proposed corrections of deficiencies in levee construction for the Alton-to-Gale Organized Levee Districts. The levees are located along the Mississippi River in Madison, St. Clair, Monroe, Randolph, Jackson, Union, and Alexander Counties, Illinois and Perry County Missouri. These comments are provided under the authority of and in accordance with the provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.); the Endangered Species Act of 1973, as amended; and the National Environmental Policy Act.

The project involves the correction of a design deficiency involving the use of inappropriate, high plasticity clays during the construction of numerous levee reaches in the Alton-to-Gale Organized Levee Districts. Alternatives considered for this project include no action, nonstructural (not desirable to the Drainage and Levee Districts), and four alternative action plans. The first alternative action plan would involve lime stabilization of the entire levee section. The second alternative action plan would involve lime stabilization of the upper levee section. The third alternative action plan would involve the replacement of the upper levee section. The fourth alternative action plan, the recommended alternative, involves injecting a slurry of hydrated lime and fly-ash at regular intervals into the levee slope to fill the cracks that form as a result of the clay shrinking and swelling and to stabilize the levees. Under the recommended alternative, no trees would be removed as part of the repair and no wetlands impacts are expected. Under the other alternative action plans, roughly 15.5 acres of bottomland hardwood wetlands would be impacted.

According to the draft EA, because of the chemical reaction that takes place with lime, fly-ash, and water, trace heavy metals are locked into the cement matrix and are no longer able to leach into the ground. The Corps should be aware that acidic water levels can affect the cement matrix

and result in leaching of heavy metals. This is unlikely to be a problem; however, efforts should be taken to ensure each site at which lime/fly-ash is injected is readily and easily identifiable.

The draft EA provides brief information regarding measures to be taken to protect water quality and aquatic area. The Illinois Environmental Protection Agency requires implementation of a Stormwater Pollution Prevention Plan for construction activities impacting one acre or more (see NPDES Permit #ILR10). We request a copy of this plan once it has been developed and will provide comments on the plan if appropriate.

The draft EA evaluated the impacts of the proposed project on the Indiana bat (*Myotis sodalis*), gray bat (*Myotis grisescens*), interior least tern (*Sterna antillarum*), pallid sturgeon (*Scaphirhynchus albus*), decurrent false aster (*Boltonia decrurrens*), Illinois cave amphipod (*Gammarus acherondytes*), and sheepnose (*Plethobasus cyphyus*). Our office provided a list of threatened and endangered species that may be present in the Alton-to-Gale project area on August 7, 2008. Since providing you the list our records have been updated and the list of species should now include the eastern massasuaga (*Sistrurus catenatus*), eastern prairie fringed orchid (*Platanthaera leucophaea*), grotto sculpin (*Cottus sp.*), rabbitsfoot (*Quadrula cylindrica cylindrical*), and small whorled pogonia (*Isotria medeoloides*), in addition to the species listed above. The sheepnose mussel is no longer listed within the project area.

Information in the draft EA indicates that the proposed project would not impact caves or trees, thus the proposed project is not likely to adversely affect the Indiana bat and gray bat. The repair would take place within the footprint of the existing levee and would not impact habitat of the interior least tern, pallid sturgeon, Illinois cave amphipod, and sheepnose mussel, thus you have determined the proposed project is not likely to adversely affect these species. In addition, you indicate that levees generally do not provide suitable habitat for the decurrent false aster, thus you have determined the proposed project is not likely to adversely affect this species. Based upon this information and provided that trees are not impacted, the Service concurs that the proposed project is not likely to adversely affect the species evaluated in the draft EA.

The Service also believes that the proposed project would have no impact on the eastern massasuaga, eastern prairie fringed orchid, grotto sculpin, rabbitsfoot mussel, and small whorled pogonia. Therefore, we concur that the proposed project is not likely to adversely affect any federally listed threatened and endangered species. This precludes the need for further action on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. Should this project be modified, or new information indicate listed or proposed species may be affected, consultation or additional coordination with this office, as appropriate, should be initiated.

Information in the draft EA indicates that there are no known bald eagle nest trees in the vicinity of any repair areas and that repair activities are not anticipated to disturb Bald or Golden Eagles. As mentioned in an email dated April 1, 2010, we believe that there may be Bald Eagle nest trees adjacent to the Grand Tower Levee Repair (Oakwood Bottoms) and potentially at the other locations of the levee repairs. We recommend that the National Bald Eagle Management (NBEM) Guidelines be incorporated into the final EA and implemented to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance,"

which is prohibited by the Bald and Golden Eagle Protection Act. A copy of the NBEM Guidelines is available at:
http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BaldEagle/NationalBaldEagleManagementGuidelines.pdf

We concur with the Corp of Engineer's Finding of No Significant Impact. Thank you for the opportunity to provide comment on the draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI). If you have any questions, please contact Matt Mangan of my staff at (618) 997-3344, ext. 345.

Sincerely,

Joyce A. Collins
Assistant Field Supervisor

cc: IDNR (Schanzle)
MDC (Sternburg)
USFS (Nicholas)
USFWS (Cail, Scott)

Lowe, Marilyn H MVS

From: Dooley, Alan J MVS
Sent: Thursday, July 15, 2010 8:07 AM
To: mutti sabo
Subject: RE: Comment on Proposed Levy Repair

Dear Mr. Sabo -

Thank you for your comment. I will forward it to the project manager for incorporation in our process. We solicit comments and inputs. Following the public meeting today -- the purpose of which is to present the CURRENT status of the project and then to hear comments from the public and stakeholders. We will post the presentation on our web site as soon as possible: www.mvs.usace.army.mil

Again, thank you for your input. This is exactly what the process is for - to share status, ideas and in the end, develop the answers that provide the best possible public safety we can.

Alan Dooley

-----Original Message-----
From: mutti sabo [mailto:muttipie@htc.net]
Sent: Wednesday, July 14, 2010 10:34 PM
To: Dooley, Alan J MVS
Cc: steve_whitworth@thetelegraph.com; mfitzgerald@bnd.com; rcfb@egyptian.net; clifftop@htc.net; Andria, Kathy MVS External Stakeholder
Subject: Comment on Proposed Levy Repair

Right Honourable Alan Dooley

Chief of Public Affairs

U.S. Army Corps of Engineers

Mr. Dooley,

I read with interest a story on the Corps levee project a week ago.
Without a doubt, portions of the levee system are seriously in need of repair. I am glad that the Corps is finally willing to address the issue. As a member of the Illinois Farm Bureau, I tend to follow the reports of the levees and locks in Farm Week. So, needless to say, I was looking forward to reviewing the Alton to Gale Organized Levee Districts, Illinois and Missouri (Continuing, Deficiency Corrections) Letter Report. At 66 pages, I was expecting a thorough report that would enlighten the public and encourage debate.

Page EA-9, paragraph 5, states “Because of the chemical reaction that takes place with lime, fly-ash, and water, trace heavy metals are locked into the cement matrix, no longer able to leach into the ground. Fine dust particles, as well, would be bound rather than released into the air.” I must take issue with this statement, because the Corps has presented it as fact without any supporting documentation for public scrutiny. There are two well studied mechanisms through which failure of this matrix is known to occur and to which the Letter failed to account for.

As you know, the classification of fly ash is based upon its pozzolanic properties rather than the minor constituents of its chemical composition. Yet the concentration of a few of these (U and Th) carries the seeds of ongoing, measurable deterioration. The Letter does not specify the source of the fly ash nor a testing scheme for minor constituent measurement. This is important because some Illinois coal seams carry U concentrations of >100 ppm (Facer, GJBX-56(79) USDOE). The coal firing process and subsequent collection of fly ash results in the beneficiation of the material and a further 10 fold increase in concentration. Damage to cement matrix is a function of total dose, and therefore concentration, from alpha and gamma emissions of decay product daughters and spontaneous fission of parent material. This can be easily modeled, yet the Letter shows no effort to do so. Microfractures of the matrix from this mechanism open the potential for further damage by the second mechanism described below.

In my opinion the general public is entitled to know whenever material will be disposed of that is in excess of natural background levels. In our area of the country, that would be U concentrations in the 2 to 3 ppm range. (USGS DDS-9, 1993). Yet, the Corps appears to have taken no measures to calculate the total Curie content of the material to be disposed of in the levees nor to limit the radiological content of the fly ash to be used to below local background concentrations. Indeed, I am not alone in this concern as HB 5203 (specifically addressing Ra isotopes from U decay) currently sits on Governor Quinn's desk after passing unanimously through the House. Since ALARA (As low as reasonably achievable) is currently enshrined in the Code of Federal Regulations, it is difficult to know what is either reasonable or achievable when the Corp provides no information of the material involved even though it is likely to be greater than background levels. It may be that the increased cost of substituting Portland cement for Class C fly ash is reasonable.

A second mechanism by which the matrix may be subject to enhanced deterioration is through the presence of sulfur. (Portland Cement Association PCA R&D Serial No. 2916a) This is particularly an issue for those repairs South of Prairie Du Pont. As anyone who lives southward of Columbia can appreciate, we have the largest expanse of gypsum/anhydrite karst between western Kansas and Appalachia. (Johnson, Int. J. Speleol. 25(3-4) 1996) Yet, it doesn't appear from the Letter that there were any water samples taken to determine free sulfur levels being fed by tributaries from this region. Additionally, sediments from this karst will undoubtedly be deposited on the sides of the levies. I question the lack of data showing that the Corps accounted for the weathering and microbial action on SO4 molecules and freeing of sulfur and the potential percolation into the levee.

Just because "They've been doing this stuff for years…" doesn't mean that it should continue doing so. Failure to test for a mechanism doesn't mean that the mechanism isn't at work. Indeed, looking though Corps studies and reports I could find nothing to address either of these two issues, let alone any synergies between them. This likely explains the lack of such reports being cited in the Letter as documentation.

At a minimum, the public deserves to see the data on these mechanisms and the Corps would need the data anyway to properly model and quantify any risk posed. The public, and their elected representatives, deserve to know the quantities of heavy metals contaminants and the number of Curies of radionuclides that will be disposed of through these levee repairs. Should the matrix fail, however unlikely that is ultimately determined to be, it will be these materials that will be deposited on the surrounding fields and into the waters.

Respectfully,

Mike Sabo

Cc:

Steve Whitworth, Alton Telegraph

Mike Fitzgerald, Belleville News Democrat

Ryan Ford, Randolph County Farm Bureau Manager

Carl DauBach, Clifftop Alliance

Kathy Andria, American Bottoms Conservancy

Lowe, Marilyn H MVS

From: Dooley, Alan J MVS
Sent: Monday, July 19, 2010 7:22 AM
To: mutti sabo
Subject: RE: Comment on Proposed Levy Repair

Mike -- Thanks for sharing. We are seeking scientific-engineering answers to these questions. FYI, Mr. Frerker is a degreed, experienced chemist. Thanks too, for coming to the public meeting. Alan

-----Original Message-----
From: mutti sabo [mailto:muttipie@htc.net]
Sent: Sunday, July 18, 2010 8:37 PM
To: Dooley, Alan J MVS
Cc: steve_whitworth@thetelegraph.com; mfitzgerald@bnd.com; rcfb@egyptian.net; clifftop@htc.net; Andria, Kathy MVS External Stakeholder
Subject: RE: Comment on Proposed Levy Repair

Mr. Dooley,

I would like to take a moment to thank both yourself and the Corps for allowing me to speak at the St. Louis meeting on Thursday.

I was a little concerned when the panel handed my question off to Dr. Frerker and the discussion on leaching ensued. Just to reiterate, the point I was was attempting to make was the risk of ingestion by fauna should the fly ash fissures become exposed through erosion or an adjacent slide.

While this wasn't the document I was thinking of, I was able to find a DOE report (Estimating Exposure of Terrestrial Wildlife to Contaminants, 1994) where on page 34 they note observations of White Tail Deer consumption of fly ash at the study site. You can see from the study that in this case the deer exceeded their NOAEL for both lead and chromium.

Since the presentation mentioned that Class C fly results from the burning of Lignite, if there is a risk of animal ingestion I believe that the following studies should also be reviewed in the interest of a comprehensive final report.

Vet Hum Toxicol. 1995 Feb;37(1):63-5.
Copper deficiency in cattle, sheep and horses caused by excess molybdenum from fly ash: a case report.

Christianson, Gene A. and Gerald A. Jacobson, 1971, Report on Molybdenosis in Farm Animals and Its Relationship to a Uraniferous Lignite Ashing Plant, North Dakota Department of Health, Environmental Health and Engineering Services, 9 pp.

M. Manolopouloua and C. Papastefanou
Jrnl Env Radio. 1992, Vol 16, Issue 3:261-71 Behavior of Natural Radionuclides in Lignites and Fly Ashes

Also, I noted on page 100 of the USACE Proceedings of REMR Workshop on Levee Rehabilitation, 1994 that the first test injections of fly ash slurry were done on the Chariton River levee system back in 1984.
Perhaps the Corps undertook some longitudinal studies that would help in your risk assessment of exposure of fly ash fissures.

Thank you for your attention in this matter.

Regards,
Mike Sabo

Cc:

Steve Whitworth, Alton Telegraph

Mike Fitzgerald, Belleville News Democrat

Ryan Ford, Randolph County Farm Bureau Manager

Carl DauBach, Clifftop Alliance

Kathy Andria, American Bottoms Conservancy

On Thu, 2010-07-15 at 08:07 -0500, Dooley, Alan J MVS wrote:
> Dear Mr. Sabo -
>
> Thank you for your comment. I will forward it to the project manager
> for incorporation in our process. We solicit comments and inputs.
> Following the public meeting today -- the purpose of which is to
> present the CURRENT status of the project and then to hear comments from the public and stakeholders.
> We will post the presentation on our web site as soon as possible:
> www.mvs.usace.army.mil
>
> Again, thank you for your input. This is exactly what the process is
> for - to share status, ideas and in the end, develop the answers that
> provide the best possible public safety we can.
>
> Alan Dooley

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

AUG 18 2010

REPLY TO THE ATTENTION OF:

Mr. Gary Lowe
Project Manager
Alton to Gale Project
Planning and Environmental Branch
U.S. Army Corps of Engineers, St. Louis District
1222 Spruce Street
St. Louis, MO 63103

Dear Mr. Lowe:

The U.S. Environmental Protection Agency, Regions 5, appreciated the opportunity to review the U.S. Army Corps of Engineers (Corps), St. Louis District's May 2010 Environmental Assessment With a Draft Finding of No Significant Impact (EA-FONSI) for the Alton to Gale Organized Levee Districts levee repair project. We responded without comment in an email dated June 2, 2010. After subsequent discussions with our Office of Resource Conservation and Recovery, we would like to provide information potentially affecting the Corps' evaluation of Alternative 4, the hydraulic injection of a lime-fly ash slurry, and to request additional information. Alternative 4 is the Corps' recommended alternative within the EA.

As we believe you are aware, on June 21, 2010, EPA issued a comprehensive proposal to regulate the disposal of fly ash and other coal combustion residuals (CCRs).[1] In this action, we are co-proposing two separate approaches regarding the regulation of CCRs for disposal in landfills and surface impoundments, while continuing to hold the beneficial use of these materials, such as your Alternative 4, exempt from federal regulation. EPA continues to strongly support the safe and protective beneficial use of CCRs. The Agency believes that there are significant environmental and economic benefits when CCRs are used in an environmentally protective manner. However, the proposed rule's preamble also identifies some concerns about specific unencapsulated beneficial uses and solicits data and information on a number of beneficial uses. As we understand, the type of use you are considering, hydraulic injection of a lime-fly ash slurry into the levee, could potentially fall in the category of unencapsulated uses that the Agency is taking comment on in the preamble of the proposed rule.

We understand that your Alternative 4 would inject the slurry within the upper 12 feet of certain slope failures along approximately 25 miles of levees. We also understand that the Corps has employed this levee stabilization technology in other Corps Districts. Because of the heightened interest in CCRs and our proposed rule, EPA is interested in any data or information related to this use, including:

[1] The proposal is available, along with frequently-asked questions and other information, at http://www.epa.gov/wastes/nonhaz/industrial/special/fossil/ccr-rule/index.htm.

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- available environmental data or information on previous applications of lime-fly ash grout,

- any leach test data characterizing the grout which would be used in Alternative 4 and soils/materials which would be used in the other alternatives being considered,

- information on the amount of grout to be used,

- any environmental information provided by the public during review of USACE's proposed action.

Should such data be available, we request that you provide it to us, as well as for inclusion in the CCR proposed rule docket (www.regulations.gov, docket number EPA-HQ-RCRA-2009-0640).

State non-hazardous waste programs are currently responsible for regulating the beneficial use of CCRs. In Illinois, the beneficial use of coal ash is addressed under a statutory exemption under Section 3.135 of the Illinois Environmental Protection Act: http://www.ipcb.state.il.us/SLR/TheEnvironmentalProtectionAct.asp, which requires characterization of coal ash for certain uses. The appropriate state program contacts regarding these matters are Ted Dragovich, Illinois EPA, at (217) 524-3306 or ted.dragovich@illinois.gov and Eric Gramlich, Missouri DNR, at (573) 526-3544 or eric.gramlich@dnr.mo.gov.

We appreciate your interest in the beneficial use of coal ash and believe you support our interest in confirming that the specific use of coal ash on the levees addresses appropriate environmental questions. If you have any questions regarding this matter, please contact Mr. Ken Westlake, Region 5, at (312) 886-2910 or westlake.kenneth@epa.gov.

Sincerely,

Bruce F. Sypniewski
Acting Director
Land and Chemicals Division

Cc: Susan Hedman, Regional Administrator
Bharat Mathur, Deputy Regional Administrator
Alan Walts, Region 5 OECA
Ken Westlake, Region 5 OECA
Jerri-Anne Garl, Land and Chemicals Division

Lowe, Marilyn H MVS

From: Cook, Kenneth M MVS
Sent: Tuesday, June 22, 2010 7:57 AM
To: Lowe, Marilyn H MVS
Cc: Lowe, Gary MVS
Subject: FW: Comments--Alton to Gale levee repairs

Marilyn,
You were not CC'd on this so I was not sure if you had gotten it in a separate email or not. Looks like we have plenty of work to do justifying the use of fly ash.

-----Original Message-----
From: Kathy Andria [mailto:kathyandria@gmail.com]
Sent: Monday, June 21, 2010 7:47 PM
To: Cook, Kenneth M MVS
Subject: Comments--Alton to Gale levee repairs

June 21, 2010

Mr. Ken Cook

U.S. Army Corps of Engineers

St. Louis District

Kenneth.m.cook@usace.army.mil <mailto:Kenneth.m.cook@usace.army.mil>

Comments on Proposal to Use Fly Ash to Repair Levees—Alton to Gale

Environmental Assessment/FONSI

http://www.mvs.usace.army.mil/pm/alton-gale/ALTON_GALE_EA_KMC_17_MAY_10_.pdf
<http://www.mvs.usace.army.mil/pm/alton-gale/ALTON_GALE_EA_KMC_17_MAY_10_.pdf>

Mr. Cook:

American Bottom Conservancy and Sierra Club hereby request an extension of the public comment period for the above-entitled project. There is not enough information to provide proper public comment in the Environmental Assessment/Finding of No Significant Impact (EA/FONSI). Fly ash is toxic and the Corps has not taken this into account in its EA/FONSI.

We also just learned that there are public meetings being held in conjunction with this project. We were not informed nor was anyone we have contacted. I am on a Corps list for email notification and on the Project Management list for USPS notification. I received NO notification of any public meetings with regard to this proposal and only learned of the meetings on Wednesday while attending a meeting of the Flood Prevention District Council.

In ordinary circumstances, a public comment deadline should be no sooner than 30 days after the date of the last public meeting, which we understand is June 29. In this case, however, we believe there is not sufficient information contained in the EA/FONSI in order to provide informed public comment. We ask, therefore, that you provide the information below as suggested by professionals in some of the comments below and issue a new EA/FONSI with a new public comment deadline after the information is provided and the new EA/FONSI issued.

We also understand that the Corps has proposed using fly ash in other levees and ask that these comments be made part of those records, too. Could you please provide us a list of where fly ash is proposed to be used to repair levees?

Below are some comments and questions from various engineers, geologists and biologists who expressed concern about the viability and wisdom of the project. Given a proper EA/FONSI and an extension of the public comment period, they would submit comments. Additional comments will follow.

Charles Norris, Professional Geologist: “Based upon my experience with CCW and its various uses in construction applications, waste stabilization, including "fixating" it with lime, I don't think this is a good idea. I have only time to skim the document you referenced. The platitudes used to characterize the proposed operations should not put anyone at ease. I can't comment in depth, because I can't take the time to look into it at depth. But, even a cursory look establishes the author(s) believe the press and "conventional wisdom" about CCWs as construction materials without appreciation of their chemical, structural, and transient limits.

The discussion address none of these issues in a meaningful manner, fails to recognize that fly ash itself a toxic material, that fly as treated with lime does not permanently bind up its contaminants, or that any initial strength that the slurry may impart is temporary and the strength is subject to dissipation as time and water weather the initial product. The text doesn't even maintain a consistent story of what is expected throughout. Initially the added lime product is described as exerting a positive reaction with the clay minerals to produce alternative silicate-aluminate minerals that add strength. Later, the lime reaction is attributed to reacting with the fly ash for its beneficial purposes.

The assertions that this material is seemingly appropriate, based upon decades of use, fail to integrate disasters like Kingston TN or Forward Township PA into the story. Those reflect in part what decades of natural processes do to structures that rely on fly ash for part of their strength. As best I can tell from a skim of the document, the assertions themselves are decades old and reflect no understanding of what has been learned during those decades

about CCWs and how they react in natural settings."

Charles H. Norris

Geo-Hydro, Inc.

1928 E 14th Avenue

Denver CO 80206

(303) 322-3171

"What is missing here is 1) any discussion about toxic metal releases when fly ash is placed in contact with water; and especially 2) discussion of the injection of normal cementitious materials that do not include fly ash."

"Coal ash can contain lots of heavy metals and other nasty stuff, but it varies greatly on the composition of the coal and the conditions (eg type of boiler) under which it is burned, and whether it is bottom ash (larger particles from bottom of boiler) or fly ash (fine particles removed from the stack dry) or scrubber sludge (fly ash mixed with calcium and sulfur). The finer the particle, the greater the surface area, and therefore the greater concentration of heavy metals (like mercury, which enters the stack as a vapor and then condenses on the particles as they cool while rising up the stack towards the electrostatic precipitator or the bag filter.

[The Corps should provide] test data from the product they plan to make from the ash, ie the slurry of hydrated lime and fly ash that they intend to inject (and presumably expect it to harden into a structural material). They are manufacturing a structural material, and doing it under poorly controlled conditions (eg dampness of clay; homogeneity of the clay). They must show proof that such a material thus manufactured is sufficiently stable to prevent leaching under the conditions to be experienced during the next century inside the levee. Potentially hostile conditions include freeze/thaw; moisture level; slumping or other failures of the soil; etc."

"I just looked at the EA and it looks like a farce to me. You should at least demand peer reviewable documentation of the 'effectiveness' claimed in the last sentence. Also ask for comparisons of structural integrity and longevity of the 4 options; for their option to be comparable, it seems they would need to fill every single crack. Finally they describe one chemical reaction between the lime and the clay, but provide no information about reactions involving the toxic metals, nor information about their mobility over the long term in the presence of saturated soil."

“I find it extremely hard to believe that the injected lime wouldn't cause a sharp increase in pH. When pH gets too high in a body of water it will cause the death of aquatic organisms. They provided no evidence to demonstrate that there would be no impact to water quality. I also see that there are several federally listed aquatic species that the project could impact. I see no evidence that EPA, NOAA fisheries/USFWS folks have reviewed this project.”

“1 They say the material was deficient during construction

but seemingly the deficient material only becomes apparent

after there's been a slide

or do they have records of were the deficient material was used in the levee construction?

That is are they going to fix all of the levees entirely

or just when they observe a slide?

If the problem is that the slope of the 1v:3h levees

should have been 1v:4h can they just place more material

on the levee slope like they could have in the first place

or in conjunction with the sand berms they constructing now

related to levee decertification?

2 There is no clear explanation as to why they only considered fly ash

as the injection material when all other repairs involved only lime

The Corps says the lime/fly ash combo has been successfully used

in "cement" on highway and subgrade projects;

levees are not cement projects and are significantly different

from use in a highway.

Why don't they give an example of successful fly ash use on a levee?

3 peg 34 no toxic concerns?

they say the heavy metals will be fixated in the fly ash lime

but that's when fly ash is used in cement

not where it'll be a semisolid slurry state exposed to water.

The public is entitled to review documentation of the 'effectiveness' claimed in the last sentence.”

The meeting this morning at the Wood River Levee District raised many more questions. Since the slides keep re-occurring and the Corps indicates that 1) it is a design deficiency in that they used inappropriate soils in constructing the levees, and 2) the levees will continue to slide and slump, shouldn’t the Corps use an alternative that would replace the high plasticity clay soil with the appropriate soil for constructing levees?

Why is there no risk analysis?

What causes a levee to slip or slide in one section but not 10 feet or 100 feet away, since it is the same soil?

Why do so many of the slides re-occur after having been repaired?

Please provide documentation as to what Memphis has used to repair their levees and where it has been done in other districts. How long does a fly ash/lime slurry repair last? Are all cracks filled?

Is the formula of coal ash in a lime slurry the same? Where did the coal ash come from? What are the constituents of the coal used? Are there toxicity reports on the coal ash? Which kind of test was used?

Where is the documentation of the “effectiveness” claimed in the last sentence of the EA/FONSI?

Gary Lowe, the project manager, indicated at the meeting with the Wood River Levee District this morning that the project is being sent to an independent peer review panel. We welcome that and support all federal projects undergoing such a review.

While we have many more questions and concerns, we will submit this preliminary comment on the original date set as the deadline for comment. We trust that Mr. Lowe will grant us an extension of the public comment period as he so indicated this morning. We look forward to receiving supplement documentation and reports and information—and especially a new EA/FONSI—so that we, and others, can make informed and proper public comment.

Thank you for your consideration of our comments.

Kathy Andria

President, American Bottom Conservancy

Chair, Illinois Sierra Club Floodplain Task Force

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

REPLY TO
ATTENTION OF:
Planning, Programs, and Project Management Division
Project Management Branch

Kathy Andria, President
American Bottom Conservancy
Chair, Illinois Sierra Club Floodplain Committee
P.O. Box 4242
Fairview Heights, IL 62208

Dear Ms Andria:

Thank you for your 21 June 2010 e-mail providing comments on the May 2010 Draft Environmental Assessment (EA) with Draft Finding of No Significant Impact (FONSI) regarding the design deficiency within the Alton-to-Gale Organized Levee Districts, Illinois and Missouri. I appreciate your support of our effort to repair the levees in the American Bottoms area. Our design team has developed responses to your initial concerns raised, and they are attached to this letter. We are currently updating our EA to address the concerns and will revise the document to provide additional information.

Also, thank you for your input and attendance at our public meeting held on 15 July 2010. As safety is our number one concern, we plan to address all concerns raised and ensure our project recommends a solution that is not only feasible but takes into account all public safety issues. We are also coordinating with the U.S. EPA to fully address all potential issues regarding the usage of fly ash. These efforts will also be reflected in our revised EA document.

As discussed at the 15 July 2010 public meeting, we will have a follow-on meeting held sometime at the end of September or early October 2010 to provide an update on our EA, provide a status of the Independent Periodic Review, and provide the current status of our recommended plan. As we begin to finalize our revised documents, the date and time of the meeting will be set, and we will contact you with the details. We look forward to discussing this project with you in the future.

Should you need additional information, please contact me at 314-331-8032 or by e-mail at gary.p.lowe@usace.army.mil

Sincerely,

Gary P. Lowe
Project Manager

ENCL 1

ENCL 1 – Response to Initial Concerns Raised:

1. We also understand that the Corps has proposed using fly ash on other levees and ask that these comments be made part of those records, too. Could you please provide us a list of where fly ash is proposed to be used to repair levees?

USACE Memphis District has utilized the lime/fly ash injection technique on similar projects since 1995. Since then, they have performed 14 projects and treated approx 17 miles on the Mississippi River and Tributaries (MR&T) projects.

For the Alton to Gale project, the levee districts along with the deficient reaches within each levee district can be found in the table below. Lime/fly ash injection is one of four possible alternatives to correct the deficient reaches within the levee districts given in the table below.

Alton to Gale Levee Districts	**Levee Repair Reach Stationing (Sta.)**	**Repair Length Linear Feet**
Bois Brule D&LD	Sta 1385+00 to Sta 1420+00	3,500 LF
Clear Creek D&LD	Sta 272+00 to Sta 385+00	11,300 LF
Degognia/Fountain Bluff D&LD	Sta 410+00 to Sta 465+00	5,500 LF
	Sta 790+00 to Sta 826+00	3,600 LF
	Sta 947+00 to Sta 1070+00	12,300 LF
East Cape Girardeau D&LD	Sta 355+00 to Sta 400+00	4,500 LF
	Sta 570+00 to Sta 575+00	500 LF
Fort Chartres D&LD	Sta 595+00 to Sta 625+00	3,000 LF
Grand Tower D&LD	Sta 25+00 to Sta 70+00	4,500 LF
	Sta 104+00 to Sta 110+00	600 LF
	Sta 425+00 to Sta 442+00	1,700 LF
	Sta 628+00 to Sta 947+00	31,900 LF
Kaskaskia Island L&D	Sta 335+00 to Sta 395+00	6,000 LF
	Sta 480+00 to Sta 496+00	1,600 LF

MESD (E. St louis D&LD)	Sta 1390+00 to Sta 1530+00	14,000 LF
Prairie du Rocher D&LD	Sta 58+00 to Sta 110+00	5,200 LF
	Sta 700+00 to Sta 840+00	14,000 LF
Preston D&LD	Sta 0+00 to Sta 25+00	2,500 LF
Wood River D&LD	Sta 198+00 to Sta 218+00	2,000 LF
Alton to Gale Levee Districts	**Total Length**	**128,200 LF**

2. Adequate information is not provided regarding the construction materials. The EA does not provide an appreciation of CCWs as construction materials and their chemical, structural, and transient limits.

   Lime and Class C fly ash are the construction materials for the recommended plan. These materials will need to meet the requirements of ASTM C 593 (Fly Ash and Other Pozzolans for Use with Lime) and ASTM C 977 (Quicklime and Hydrated Lime for Soil Stabilization)

3. Fly ash is a toxic material and the Corps has not taken this into account in its EA/FONSI. Fly ash itself is a toxic material and fly ash treated with lime does not permanently bind up its contaminants, or that any initial strength that the slurry may impart is temporary and the strength is subject to dissipation as time and water weather the initial product.

   Regions 5 and 7 of the EPA have reviewed our EA/FONSI and have no comments on the proposed project.

   In addition, according to the EPA's web page (http://www.epa.gov/osw/conserve/rrr/imr/ccps/flyash.htm), Fly ash is listed as an acceptable material as an ingredient in soil stabilization as an industrial recycling material.

   Upon further discussion with the EPA, we will provide additional information in our EA to ensure we fully address this concern.

4. The text of the EA does not maintain a consistent story of what is expected throughout. Initially the added lime product is described as exerting a positive reaction with the clay minerals to produce alternative silicate-aluminate minerals that add strength. Later, the lime reaction is attributed to reacting with the fly ash for its beneficial purposes.

The use of the lime and fly ash in the grout injection process places the lime-ash mixture well inside the levee structure and is not an "exposed' utilization of the ash. The lime and ash grout undergo a chemical solidification/stabilization reaction identical to the reaction recommended by the USEPA for immobilizing trace metals in truly hazardous wastes.

5. The assertions that this material is seemingly appropriate, based upon decades of use, fail to integrate disasters like Kingston TN or Forward Township PA into the story. Those reflect in part what decades of natural processes do to structures that rely on fly ash for part of their strength. The assertions themselves are decades old and reflect no understanding of what has been learned during those decades about CCWs and how they react in natural settings.

   The fly ash disasters referenced above are not due to the use of lime/fly ash injection. The Kingston TN incident involved the rupture of an ash dike. The Forward Township PA incident involved the collapse of a massive fly ash hill. To date, there have not been any known failures associated with lime/fly ash injection.

6. The EA is missing any discussion about toxic metal releases when fly ash is placed in contact with water

   The use of the lime and fly ash in the grout injection process places the lime-ash mixture well inside the levee structure and is not an "exposed' utilization of the ash.

7. Why was an alternative not discussed that includes the injection of normal cementitious materials that do not include fly ash?

   The lime/fly ash injection technique was an alternative that was developed at a Value Engineering Study that was completed for this project. Since this process has been successful for many years in the Memphis District, this option was offered as an alternative for the Alton to Gale project. Fly ash is more economical than the injection of normal cementitious materials. In addition, The use of an alternative cement grout would incidentally produce more greenhouse gas than the fly ash lime product. Cement production is a leading source of greenhouse gas

8. Coal ash can contain lots of heavy metals and other nasty stuff, but it varies greatly on the composition of the coal and the conditions (e.g., type of boiler) under which it is burned, and whether it is bottom ash (larger particles from bottom of boiler) or fly ash (fine particles removed from the stack dry) or scrubber sludge (fly ash mixed with calcium and sulfur). The finer the particle, the greater the surface area, and therefore the greater concentration of heavy metals (like mercury, which enters the stack as a vapor and then condenses on the particles as they cool while rising up the stack towards the

electrostatic precipitator or the bag filter. The Corps should provide test data from the product they plan to make from the ash, ie the slurry of hydrated lime and fly ash that they intend to inject (and presumably expect it to harden into a structural material). They are manufacturing a structural material, and doing it under poorly controlled conditions (eg dampness of clay; homogeneity of the clay). They must show proof that such a material thus manufactured is sufficiently stable to prevent leaching under the conditions to be experienced during the next century inside the levee. Potentially hostile conditions include freeze/thaw; moisture level; slumping or other failures of the soil; etc.

Contractors will utilize locally available materials; however, test results will be required prior to approval of the materials. The USACE will require this in any contract that we enter into. In addition, only approved laboratories will be used to complete the testing. These are requirements of our contract specifications. Certification and Manufacturer's Literature of all materials and equipment used in the lime/fly-ash slurry injections shall be submitted to the Government prior to commencement of work. A quality control procedure would be in place for the continued testing of the material placed during the entire project.

9. Provide comparisons of structural integrity and longevity of the 4 options; for their option to be comparable, it seems they would need to fill every single crack.

All four alternatives correct the design deficiency associated with the inappropriate use of highly plastic soils. All four alternatives ensure the authorized level of protection has a sufficient factor of safety. Anything less than a factor of safety of 1.4 was considered unacceptable. The lime/fly ash injection process utilizes injector rods that have tips capable of dispersing slurry in a 360-degree pattern. In addition, the injections shall be in two sequences. For the first phase, the spacing for the injections shall be 5 feet on center each way. A minimum cure time of 48 hours will be required between the primary and secondary phase injections. The secondary phase injections shall be placed between the primary injections. This sequencing ensures that all cracks are filled.

10. The EA describes one chemical reaction between the lime and the clay, but provides no information about reactions involving the toxic metals, nor information about their mobility over the long term in the presence of saturated soil.

Electric Power Research Institute (EPRI), a nonprofit center for public interest energy and environmental research, has indicated that fly ash they have tested has not exceeded the trace metals limits set by EPA in

that test method called the Toxicity Characteristic Leaching Procedure (TCLP). The acetic acid solution in the TCLP Method is designed to simulate the result of rainwater infiltrating a landfill, reacting with municipal solid waste, and then leaching through the waste being tested. The numerical limits for the RCRA toxicity characteristic (40 CFR 261.24) were derived using the same scenario and were set at levels that would prevent the groundwater under the landfill from posing a threat to human health and the environment.

In addition, based on the experience of the U.S. Army Corps of Engineers utilizing this process, there has not been any evidence of environmental concerns on any of the levee sections treated.

To provide additional information in the EA, additional testing data will be included in the revised version of the document to better address this concern.

11. It is extremely hard to believe that the injected lime wouldn't cause a sharp increase in pH. When pH gets too high in a body of water it will cause the death of aquatic organisms. The EA provides no evidence to demonstrate that there would be no impact to water quality.

The use of the lime and fly ash in the grout injection process places the lime-ash mixture well inside the levee structure and is not an "exposed' utilization of the ash. A sharp increase in pH would require mobile hydroxide ions. Given that this is a cementations mix, there should be no dramatic increase in pH.

12. The EA says that the material was deficient during construction but seemingly the deficient material only becomes apparent after there's been a slide or do they have records of where the deficient material was used in the levee construction?

Since the source of slides is due to the use of highly plastic clay, slides provide the best evidence of where deficient material (highly plastic clays) was used for construction of the levee.

13. Is the Corps going to fix all of the levees entirely or just when they observe a slide?

The only areas proposed to be treated are those deficient sections of levee where slides often occur. Proposed areas of treatment were determined based on the data collected of where slides have occurred in the past. Past data shows slides occurring in the same areas. Approximately 25 miles of levee will be repaired throughout the Alton to Gale Levee System.

14. If the problem is that the slope of the 1v:3h levees should have been 1v:4h can they just place more material on the levee slope like they could have in the first place or in conjunction with the sand berms they constructing now related to levee decertification?

Within many section of the deficient levee reaches there is not adequate room for a 1:4 slopes. Changing to a 1:4 slope would require additional real estate and in some areas would impact adjacent bottomland hardwood wetlands - wetland impacts from encroachment beyond the toe of the levee is described in the EA. Not all deficient areas have berms.

15. There is no clear explanation as to why they only considered fly ash as the injection material when all other repairs involved only lime

Not all other repairs require lime. One alternative involves replacing the material with new suitable material.

16. The Corps says the lime/fly ash combo has been successfully used in "cement" on highway and subgrade projects; levees are not cement projects and are significantly different from use in a highway. Why don't they give an example of successful fly ash use on a levee?

USACE Memphis District has utilized the lime/fly ash injection technique on similar projects since 1995. Since then, they have performed 14 projects and treated approx 17 miles on the Mississippi River and Tributaries (MR&T) projects.

17. Why are no toxic concerns addressed? The EA says that the heavy metals will be fixated in the fly ash lime but that's when fly ash is used in cement not where it'll be a semisolid slurry state exposed to water.

The use of the lime and fly ash in the grout injection process places the lime-ash mixture well inside the levee structure and is not an "exposed' utilization of the ash.

Individual states have evaluated the proper uses for many different by-product materials to determine appropriate beneficial uses for these materials, including coal fly ashes. The states of Illinois and Missouri have both determined that fly ash grout is a proper and beneficial use for coal fly ash.

As mentioned previously, an appropriate leaching test will be run to demonstrate the efficacy of the method.

18. Since the slides keep re-occurring and the Corps indicates that 1) it is a design deficiency in that they used inappropriate soils in constructing the levees, and 2) the levees will continue to slide and slump, shouldn't the Corps use an alternative that would replace the high plasticity clay soil with the appropriate soil for constructing levees?

Replacing the soil with the appropriate material is one of the options proposed but is not the recommended alternative due to the high cost.

19. Why is there no risk analysis?

A risk assessment (RA) of the material along with the appropriate leaching tests, such as but not necessarily TCLP, will be used to demonstrate the efficacy of the method.

Also, a Cost and Schedule Risk Analysis was conducted on the chosen alternative in accordance with Engineer Regulations (ER) 1110-2-1150, ER 1110-2-1302, and Engineering Technical Letter 1110-2-573.

20. What causes a levee to slip or slide in one section but not 10 feet or 100 feet away, since it is the same soil?

Highly plastic clays have low residual long term shear strengths compared to low to medium plastic clays. The 1 vertical on 3 horizontal levee slopes are too steep for the low residual strengths clays. The instability problems are compounded with the high plasticity clay materials shrinking dramatically resulting in numerous, wide, deep cracks in the levee embankments. High plastic clays will undergo extreme volume changes which are referred to as high shrink and swell potential characteristics. The shrinkage capability manifests itself by developing large deep cracks in the levee embankment as shown in Figure 4. Precipitation from rainfall, snowmelt, and/or floodwater flows into the large deep cracks (which contributes to the continued reduction of the embankment strength), and pools within the cracks while the water is absorbed. Soils near the bottom of the embankment become saturated and lose their shear strengths. As the clay soils in the upper portions of the embankment absorb water and gain weight, the clays at and near the bottom of the embankment lose a considerable amount of shear strength. When the embankment weight exceeds the underlying shear strengths, excessive embankment movement occurs. The levee section is no longer stable, lacking integrity and the ability to resist the water pressures present during a flood.

21. Why do so many of the slides re-occur after having been repaired?

Several methods have been used to prepare slides. Some have proved effective and others have not. Lime treatment of the material has been

a proven effective method along with lime/fly ash injection. Where both methods have been used there has not been re-occurring slides. Many methods just treat the area where the slide occurred. They have not addressed the entire deficient levee reach. Repairing the individual slides does not provide a long term solution for design deficiency. Repairing an individual slides only corrects that specific area where the slide occurred and not adjacent or other deficient areas.

22. **Please provide documentation as to what Memphis has used to repair their levees and where it has been done in other districts. How long does a fly ash/lime slurry repair last? Are all cracks filled?**

The process of lime/fly ash injection identified for this project mirrors the process utilized by Memphis district. Memphis has been utilizing this process since 1995, and it has been deemed a successful long term solution to address the issues that surround the highly plastic clays utilized in levee construction.

Injections will be completed in two phases. The spacing for the injections shall be 5 feet on center each way. The average minimum quantity of lime and fly-ash to be injected for the primary phase injections shall be 1 pound per cubic foot based on the total area to be stabilized. A minimum cure time of 48 hours will be required between the primary and secondary phase injections. The secondary phase injections shall be placed between the primary injections. The average minimum quantity of lime fly-ash to be injected for the secondary phase injections shall be 0.5 pounds per cubic foot based on the total area to be stabilized. The injection sequence shall be in swaths perpendicular to the levee centerline. The injection sequence shall begin at the landside limits of injection and proceed riverward.

23. **Is the formula of coal ash in a lime slurry the same? Where did the coal ash come from? What are the constituents of the coal used? Are there toxicity reports on the coal ash? Which kind of test was used?**

Lime/fly-ash shall be proportioned at the ratio of 1 part lime to 3 parts fly-ash and shall be mixed into a slurry in the range of 6 to 8 pounds lime/fly-ash per gallon of water. Class C fly ash will be utilized from local sources. The fly ash will conform to all applicable sections of ASTM C 593.

24. **Where is the documentation of the "effectiveness" claimed in the last sentence of the EA/FONSI?**

USACE Memphis District has utilized the lime/fly ash injection technique on similar projects since 1995. Since then, they have performed 14 projects and treated approx 17 miles on the Mississippi

River and Tributaries (MR&T) projects. All of these levee repairs have been successful and have not experienced levee slides once the repairs have been completed.