

September 8, 2000

FINAL REPORT

Chat Usage Subcommittee

of

**Governor Frank Keating's
Tar Creek Superfund Task Force**

Co-Chairmen:

Neal McCaleb, Secretary of Transportation

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Executive Summary

Establishment of the Task Force

Governor Frank Keating established the Tar Creek Superfund Task Force in January 2000, to examine the causes and effects of the Tar Creek Superfund site. One of the subcommittees formed was this Chat Usage Subcommittee.

The conditions existing at the start of our work were:

- Regulatory guidelines on the uses of chat were obscure, unclear, and inconsistent.
- There was a BIA moratorium on the sale of Native American-owned chat.
- There was no central point of contact to market the chat.
- There was not a way to effectively and economically move large quantities of chat to distant markets.
- Reclamation efforts on depleted chat pile locations were not being made, the sites were unusable for productive purposes, and much of the land was not on the tax rolls.
- The chat piles were a historic “Attractive Nuisance”.

Our goal was to find ways to alleviate the health and environmental hazards caused by the presence of the mine tailings resulting from lead and zinc mining and milling that occurred during the last century in Ottawa County, Oklahoma, and to provide economic opportunities to the area.

To accomplish our goal, our subcommittee had these objectives:

- Develop awareness on the part of regulatory agencies of the necessity to remove the chat as an integral part of solving the current health and environmental hazards caused by the presence of the chat piles. This includes the acknowledgement by the EPA that the lead in the chat piles is a health and environmental hazard and must be removed.
- Evaluate the real and perceived health and environmental hazards of chat where it is located today, and at its final usage locations.
- Establish safe, effective, and economical guidelines for chat usage.
- Accelerate the accepted usage of chat in transportation industry projects.

- Find better and lower cost ways to ship the chat to distant markets.
- Look for new ways to use chat in transportation construction projects.
- Promote new uses of chat in manufactured products.
- Remove the moratorium on the sale of Indian-owned chat (which represents 60 to 80 percent of the chat volume).

To achieve our objectives and reach our goal, the subcommittee members

- Participated in the Task Force meetings,
- Held meetings with persons and organizations affected by, and interested in solving, the current situation,
- And hosted a Chat Usage Guidelines Symposium on August 24, 2000.

Subcommittee Recommendations

This subcommittee believes the health and environmental problems caused by the presence of the chat piles can never be fully mitigated unless the chat is removed and used in a safe, economical, and effective manner.

The subcommittee believes that any viable and effective plan to mitigate the health and environmental hazards of the chat piles must include these recommendations.

1. Establish a local Industrial Authority to:
 - Create a central point of contact to effectively market and load chat.
 - Build and operate a railroad loading facility near Quapaw to reduce the cost of transporting chat to distant markets.
 - Locate backhaul opportunities for rail and truck shippers to reduce the shipping costs of chat and to reduce shipping cost of materials into Ottawa County.
 - Foster cooperation between chat owners and shippers and the regulating agencies so the chat can be safely, economically, and effectively sold and used.
 - Research Federal and State laws and regulations to remove barriers that hinder the sale and use of chat so the marketing efforts will be effective and profitable.

- Research Federal and State laws and regulations that establish and enforce regulatory responsibility for remediation of the chat piles to obtain financial assistance in reducing shipping costs to distant markets.
 - Estimated Start up cost \$125,000
2. Request Bureau of Indian Affairs lift the moratorium on the sale of chat from Native American-owned land.
 3. Request Federal and State agencies treat all chat equally.
 4. Request EPA, ODEQ, and appropriate County, State, and Federal Health Agencies establish safe, effective, and economical chat usage guidelines based on the published output of the Chat Usage Guidelines Symposium and other information available from the Symposium participants, presenters, observers, and the agencies' testing processes.
 5. Request EPA and ODEQ establish testing processes that are available at a reasonable cost to chat owners, shippers, and buyers.
 6. The Chat Use Subcommittee recommends ODEQ include the following projects as part of its Remedial Investigation and Feasibility Study (RIFS) for the nonresidential part of Operable Unit 2:

Develop Optimum Hot Mix Asphalt Designs .

Create optimal hot mix asphalt designs using chat to determine the most economically feasible mix designs to produce more cost effective and safer road base and surface courses. This design formula should take into account the prices of competing aggregates obtained in close proximity to project sites and the chat price point requirements necessary to produce the optimal design. Preliminary results of the cost benefits analysis would be available within one year. The full study would be completed within two years.

Estimated Cost \$500,000

Develop Chat Marketing Program, Facilities Costs, and Operations Budget.

Evaluate the market dynamics of chat usage in transportation construction projects within a shipping distance economically served by truck, rail, and barge services. This study should be conducted in conjunction with the hot mix asphalt designs to determine the estimated revenue stream from chat sales. The study should include potential market usage, chat volumes, raw chat prices, competing aggregate costs, initial and ongoing marketing costs, rail facility infrastructure costs (such as sidings, switches, loading terminals, and rail cars), operational cost of the facilities, and other pertinent factors. The studies and budgets could be completed within six months.

Estimated Cost \$589,000

Develop Pilot Projects

Implement Pilot Projects in Ottawa County, and another Oklahoma locale that lacks suitable aggregates, to evaluate the safety, effectiveness, and economics of:

- a. Resurfacing county gravel roads with 2/3 clay, 1/3 chat, and an emulsifier.
- b. Resurfacing county gravel roads with 2/3 clay and 1/3 chat.
- c. Chip sealing county gravel roads.
 - d. Field testing the new hot mix asphalt designs.

These pilot projects would be divided into two main tasks. The first task is to evaluate the safety of the finished project. The second is to evaluate the effectiveness and economics of the finished projects.

Cost Summary

Establish Industrial Trust	\$125,000
Develop Hot Mix Asphalt Mix Designs	\$500,000
Develop Marketing Plan, Facilities Plan, Operations Budget	\$589,000
Pilot Projects	<u>\$600,000</u>
Total Cost for All Recommendations	\$1,814,000

Background Information

Volume and Market Value of Chat Piles in Ottawa County, Oklahoma

The U. S. Army Corps of Engineers (USACOE) measured the volume of the chat during the spring of 2000.

	Volume of chat		60,000,000	Cubic yards
Weight, (generally accepted unit of measure for sales)		75,000,000	Tons	
Years supply of chat at current shipping volumes	850,000 tons per year	88	Years	
Single rail car tonnage capacity		150	Tons	
Rail car loads		500,000		
Annual potential shipping volume estimate	250 train loads of 100 cars each	3,750,000	Tons	
Year's supply of chat	At an annual shipping rate of 3,750,000 tons	20	Years	
Annual sales value of the chat	At \$4.00 per ton for 3,750,000 tons	\$15,000,000		
Total Value of chat loaded on rail cars @ \$4.00 per ton	75,000,000 tons	\$300,000,000		
Annual payroll to gather and load the chat	At \$.25 per ton	\$937,500		
20 year payrolls	At \$937,500	\$18,750,000		

Chat Ownership – BIA Moratorium on Sale of Native American-Owned Chat

Sixty to 80% of the remaining surface chat is on lands owned by members of the Quapaw Tribe of Oklahoma and held in trust by the Bureau of Indian Affairs.

In 1997, the Bureau of Indian Affairs placed a moratorium on the sale of chat from Native American-owned land. There were and are no restrictions on the sale of chat from non-Native American-owned land. The EPA disagreed with BIA's moratorium actions in a memo from Gary Moore, Federal On-Scene Coordinator to Dan Thayer, Environmental Protection Officer, Bureau of Indian Affairs, dated October 23, 1997. The memo outlined uses of chat that the EPA said is not likely to present a threat to human health or the environment. The memo suggested a joint meeting of the BIA, EPA, and the State of Oklahoma, followed by a stakeholder meeting involving the chat owners and chat processors.

Land Values

The presence of the chat on the land in the Tar Creek Superfund site has resulted in loss of productive capacity of the land and extremely depressed land values. Owners have abandoned much of the chat-covered land, resulting in the land being removed from the tax rolls. This land has been used as dumps with the health and environmental dangers of that type of use.

Removing the chat and reclaiming the land will add value to the land and increase Ottawa County tax rolls. Reclaiming 20% of the 40 square miles included in the superfund site would add 5,120 acres to the economic base of the county. The current land sales value for raw land in good condition is \$750 per acre. This would add \$3,840,000 land value to the economic base. Economic income potential value of \$100 per acre would generate \$512,000 in income to the area. Estimated annual additional property tax income generated in Ottawa County, using the lowest tax rate of \$2.43 per acre, would generate \$12,442 annually.

20% of the Superfund site land area reclaimed	5,120 acres of total 25,600 acres	Market value at \$750 per acre	\$3,840,000
Annual income per acre	5,120 acres	\$100 per acre	\$512,000
Annual property tax revenues on bare land	5,120 acres	Tax rate of \$2.43 per 10 acres	\$12,442

Chat Qualities

Chat has been used for many years as an aggregate for asphalt road construction and has performed very well. Its use will be more widespread if the marketing and transportation issues are resolved. Chat is as hard as steel, which gives it a long life when used as a driving surface material. The road surface will last longer than one made from softer aggregates such as the more commonly used limestone. Road usage life is extended, reducing overall costs for maintenance and replacement.

When chat is fractured, the smaller pieces always have faceted surfaces, similar to arrowhead surfaces. Softer rock such as limestone does not facet as much when crushed. This characteristic increases chat's value as a road building material for two main reasons. The first is the angular surfaces cause a better bond between the aggregate particles and the binding agent, generally asphalt. The second is the angular surfaces provide better skid resistance, "braking power", which provides a safer driving surface. Softer rock such as limestone or sandstone, "polish off" and become slick after a period of traffic wear.

Chat Usage in Transportation Construction Projects

As aggregate in Hot Mix Asphalt

As aggregate in Cold Mix Asphalt

As a driving surface layer on gravel roads

As the fine aggregate in "slurry seals" on pavement

As aggregate in Bituminous Surface Treatments (chip seal)

As deicing treatment, when mixed with salt

Transporting Chat to Distant Sites

Railroads - It is necessary to use rail shipping to reduce transportation costs to distant markets. Previously used rail sidings, rights-of-way, and loading facilities have been removed, so this option is not currently available. This subcommittee recommends the re-establishment of rail loading facilities.

Trucks – are the only current method of shipping.

Subcommittee Goal

Promote uses of mine tailings (chat) that will alleviate health and environmental hazards in Ottawa County, Oklahoma, and provide positive financial opportunities to that area.

Subcommittee Objectives

Determine safe uses for chat in transportation industry construction projects.

Promote the use of chat in transportation industry construction projects.

Develop a plan to safely, economically, and effectively market the chat.

Promote the use of chat in manufacturing processes.

Seek guidelines for the safe, economical, and effective additional uses of chat.

Remove the public perception of health and environmental risks of chat.

Clarify the health, environmental, and commercial issues of chat.

Form a group of knowledgeable specialists who have an interest in solving these issues, and who can provide future guidance on these issues.

Prepare a set of guidelines for the safe, economical, and effective loading, transporting, distant storage, and final use of chat.

Conduct a Chat Usage Guidelines Symposium to clarify health and environmental issues and prepare guidelines that will allow for the chat to be used in a safe, economical, and effective manner.

Symposium

Background

Because County, State, and Federal laws and regulations governing chat usage are obscure, vague, and inconsistent, the Chat use subcommittee needed additional information for assistance in preparing chat use guidelines. A symposium was held in Miami, Oklahoma on August 24, 2000, to develop guidelines on chat usage. Guidelines developed by the Symposium will provide input and guidance for business practices, rules, and regulations regarding the commercial marketing, loading, transporting, storage, and final uses of the chat.

Below are some of the many reasons why the chat is still piled up in Ottawa County, thereby perpetuating environmental and health hazards and preventing the chat owners and others from achieving the economical benefits of the chat.

- Health and environmental issues
- Perception of health and environmental hazards
- BIA moratorium on sales of chat from Native American-owned land
- Lack of clear legal and regulatory guidelines for transporting, storage, and final commercial uses of chat
- No central point of contact for marketing the chat
- Lack of adequate transportation facilities to move large quantities of the chat economically

Goal of the Symposium

Gather legal and technical specialists, who have a vested interest in the safe, economical, and effective uses of chat, to clarify the issues and prepare guidelines for loading, transporting, distant storage, and final uses of the chat.

Objectives

Clarify the health, environmental, and commercial issues of chat.

Gather a group of knowledgeable specialists who have an interest in solving these issues, and who can provide current and future guidance on these issues.

Prepare a set of guidelines for the safe, economical, and effective loading, transporting, distant storage, and final use of chat.

Outcomes of the Symposium

Knowledgeable specialists attended and exchanged ideas.

The participants were reluctant to look at the “big picture” of the chat issues. Too much time was spent arguing about small details.

The symposium requests BIA lift the moratorium on the sale of chat from Native American-owned land.

The symposium requests that all regulating agencies treat chat equally, no matter where it originated.

An attempt was made to determine the safe lead content of chat that would allow it to be used in any commercial non-residential use. No agreement was reached, although there was some consensus on 400 PPM.

An obvious conclusion by the participants and observers is: Chat is an emotionally charged and difficult to define issue. It will take much effort on the part of the regulators to develop a consensus between the chat owners, producers, users, and regulators on the safe and economical uses of chat.

Definitions

“**Chat**” as used in this report, is granular mine tailings resulting from lead and zinc mining in the Tri-State (Oklahoma, Kansas, and Missouri) Mining District. The main substance of the chat is chert, a flint-like rock that is as hard as steel and is 80% faceted.

“**Fines**” are particles of unprocessed chat that will pass through a #200 sieve. This term does not apply to processed chat that has been mechanically reduced in size.

“**Processed**” refers to the products of the process of separating chat particles by passing over various sizes of screens to separate the various sized particles. This process can use water as part of the process, or it can be done without the use of water.

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Acknowledgements

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Private Firms Providing Assistance

Oklahoma Publishing Company	Subcommittee forum web site
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Illustrations

Graphics of a chat pile, methods of loading and transporting chat, using chat on road construction projects, and the final desired result of this subcommittee.



Current view of a Tar Creek Superfund site chat pile



This is one version of a chat loading facility. Railroad tracks are present but not visible in the picture.



Typical rail cars used to transport chat. There is enough chat to fill 500,000 of these cars.



This is a typical "belly dump" site to unload rail cars loaded with chat.



The chat is moved by conveyor and placed in piles until needed.



The highest-volume use of chat is road building.



This is a road construction site.



Trucks shown delivering asphalt to the job site from a hot asphalt mixing plant.



A "Lay Down" machine is shown receiving asphalt from the truck and spreading it uniformly on a prepared roadbed surface.



A Steel Wheel Roller compacts the surface after the Lay Down machine spreads the asphalt.



New asphalt highway.



A future view of the Tar Creek Superfund site area after the chat piles are removed.