Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Kevin Christensen, PE
Construction Engineer

From: Paul Jagoda, PE
Construction Engineering Services Engineer

Date: August 18, 2008

Subject: Construction Review Report-Butte District-STPP 87-1(9)0 Hebgen Lake-E&W CN 5960

Please find attached a Construction Review Report for the subject project.

If you have any questions or require additional information, please contact Bill Fogarty or myself.

PJ/WCF/wcf

cc: Loran Frazier, PE
Jeff Ebert, PE
Clay Blackwell, PE
Tom McCormick, PE
Michael Kulbacki, FHWA
Jeff Patten, FHWA
Dale Hancock, EPM
Joe Olsen, PE
Lesly Tribelhorn, PE
Lisa Durbin, PE
Suzy Price
Tom Martin, PE
Bill Grmoljez
Construction Reviewers
Ray Stocks
Chuck Reynolds

CONSTRUCTION ENGINEERING SERVICES PROJECT REVIEW REPORT		
Project Number:	STPP 87-1(9)0	
Designation:	Hebgen Lake- E&W	**MDT District:** Butte
Control Number:	5960	**EPM:** Dale Hancock
Award Date:	April 7, 2008	
Review Date: July 29 & August 11, 2008		
Review Made By: Bill Fogarty	**In Company With:** Shane Johnson, CE	
Project Description: Cold In-Place recycle, digout, crack sealing, seal and cover, bridge deck overlays and guardrail improvements on US 287 (P-87) in Madison and Gallatin Counties		
Review Type: (See attached sheet on review report types) ☒ **Oversight** ☐ **Subject Specific-** ☐ **Training** ☐ **Investigatory** ☐ **Constructability** ☐ **Post Construction**		

CONTRACT INFORMATION:

Contractor: Jim Gilman Excavating, Inc.

Contract Amount: $2,839,198.33

Completion Date: October 20, 2008

Phases Inspected: Cold In-place recycle (CIR), fog seal, seal coat guardrail and traffic control.

Work in Progress: CIR, fog seal, seal coat and traffic control.

Cold In-Place Recycle: On the day of my July review, subcontractor Valentine Surfacing was conducting CIR operations and Gilman Excavating was placing the CIR materials with standard paving equipment.

The design for this planned surfacing option requires the existing bituminous surfacing be milled to a depth of 0.20'. Those materials are then sized and blended with a lime slurry (1.4% by weight) and an emulsified asphalt binder (SemMaterials CIR-EE). As indicated in the CIR mix design, 2.5% by weight asphalt emulsion is introduced at start up each day. The asphalt binder ratio is constantly monitored and is typically reduced slightly over the course of a given day as in-place material types vary and surface and ambient temperatures increase. This is especially important because if the combined asphalt content is too high; the material will not feed through the recycling equipment. CIR production rates have been approximately 2.0 lane miles/day.

Cold In-Place Train- EB Lane Near Kirkwood

CIR Material Cast From The Pug Mill & Shown in Windrow

CIR Paving Equipment

Valentine staff noted that use of a large pickup machine, such as the one shown above, is necessary when placing CIR materials. The Cedarapids depicted above is Gilman's largest. Compaction and density requirements are being monitored in accordance with MT 219-04, Control Strip B- Plant Mix Paving. Contract provisions specify four revisions to this method regarding specifics about constructing the test strips. MDT staff developed 3-4 new density curves initially; those curves have proven sufficient for all work performed to date. Gilman is compacting the mixture with two CAT CB 634D (14 ton) steel drum rollers utilizing alternating vibratory and static passes and finishing with a pneumatic tire roller. When first compacted, the CIR material sometimes appears stressed (photo below left) however, by alternating the use of vibratory/static modes on the rollers, the finished surface is reasonably uniform (photo below right).

Fog Seal and Blotter- Gilman is applying emulsified asphalt SS-1 at a diluted rate of 0.10 gal. /yd2. Fog seal is applied each day and allowed to cure prior to opening to traffic. Gilman found that if not fog sealed, the CIR materials raveled under traffic, much like an untreated crushed aggregate base material would, which then requires additional finish blade work and rolling before application of fog seal. SemMaterials representatives recommend against applying fog seal at a rate higher than 0.10 gal. /yd2 as doing so could seal moisture in the mixture and retard CIR cure.

Contract provisions allow placement of the planned surface treatment (seal coat) once the moisture content in the CIR material is 1.5% or less. Moisture samples taken by dry coring method four days after placement resulted in 0.5% moisture content.

Fog Seal Penetration

Surface Damage Resulting From Static Loading

Gilman did not have a spreader available during CIR operations therefore blotter was not applied on fog sealed surfaces. This appears to have resulted in numerous areas throughout the project where equipment was stopped or parked on the fog sealed surface allowing the seal emulsion to adhere to the equipment tires. The photo above right illustrates shallow depressions left in the fog sealed surface. Application of blotter material would serve as a “bond breaker” between the tacky emulsion and equipment tires. The contractor later revisited these areas and applied additional SS-1 however, this does not address depressions remaining on the surface and the potential for damage caused from water collecting in the depressions.

Traffic Control: Two pilot cars were leading traffic through the CIR work zone; delays were kept to acceptable levels. “Stop, Wait Here For Pilot Car” signs mounted on portable trailers were positioned at active approaches. Variable message boards were positioned at each end of the project.

Seal Coat: Gilman began seal coat placement on August 11 working from the junction of US 191, going west. SemMaterials supplied CRS-2P was applied on the first two miles at an application rate of 0.42 gal./ yd2. Based on MDT’s and the contractor’s visual analysis of initial cover material embedment, the rate was increased to 0.44 gal./ yd2. This resulted in an initial embedment ranging between 40-60%.

Seal Coat Operation- 8/11/08

Sampling Initial Cover Material Embedment

Erosion Control & Environmental Issues: Work in this project results in minimal environmental impacts, areas of disturbance west of the digout location had fiber rolls installed.

Change Orders:

- #1 No-cost change order adding provisions to ensure statewide uniformity.

Claims: None to date.

EPM Diaries: Did not review.

Items Discussed With Project Staff: SiteManager:

- Field personnel noted that it is difficult to enter daily information on laptop computers while in vehicles. Positioning laptops on the vehicles center console (when applicable) requires an awkward twisting position when typing. An articulating mount inside the cab seems appropriate, what does MHP use?
- Transferring totals from templates to SiteManager requires total from template be written down and manually entered again in SiteManager. Errors (transposing numbers etc,) may occur when doing this, is there a better way?

Issues Discussed and Follow-up Needed: Special provisions governing CIR work should be revised to clarify the following:

- Compaction and Density Requirements- Requires that CIR materials be compacted to a minimum 97 percent of the target density obtained from the test strip method. A time frame for meeting this requirement should be specified for example, prior to opening to traffic, etc. Provision does not specify what happens if density requirements are not met.
- Method for determining moisture content of CIR material- MDT staff questioned the sampling frequency specified and when samples should be taken. The frequency specified in the provisions (2 samples/ 2000' section/ lane) would have required 130 samples taken on this thirteen mile long project.
- Fog Seal and Blotter- Type and gradation of blotter material should be specified in contract or referenced to applicable specification. Subsection 407.02.2 Blotter Material appears to be the only MDT specification regarding gradation limits for blotter material.
- A surface smoothness specification should be developed for use on CIR projects

Areas of Good Practice/Positive Aspects:

- Aside from the minor inconveniences noted previously, project staff are satisfied with the functionality of SiteManager software.
- Communication between MDT and contractor staff.
- The CIR treatment improved the ride when compared to the present travel way.

- End of Report