LOS ALAMOS SCIENTIFIC LABORATORY
UNIVERSITY OF CALIFORNIA
LOS ALAMOS, NEW MEXICO 87545
Telephone Ext:

OFFICE MEMORANDUM

TO : Virginia L. Christy, LS-6 MS-495 DATE November 28, 1979

THRU : T.K. Keenan, H-7 Group Leader MS-518 TKK

THRU : John Warren, H-7 MS-518 JWarren

FROM : Miguel Salazar, H-7

SUBJECT : Pit Side-Wall Fracture Sealing Methods

SYMBOL : H-7B-79-39

MAIL STOP: 592

1858 General

Our current covering procedure for pit waste requires that no waste is in direct contact with the pit walls. Fine ground tuff is placed over the waste and consequently is used as a filler and sealant on open side wall fractures. Some concern was expressed by you that other sealing material should be used to fill the open joints and fractures in Pit 10. Consequently, I asked that the open joints in Pit 10 be marked so that we could take extra precautions and make sure we would seal the joints with tuff. In addition, I requested comments on other types of sealing material that we may be able to use. Mr. Burton's recommendation on sealing material was recieved on October 24 (memo LS6-79-62). I decided to use Pit 25 as a test pit to apply bentonite as a sealant because Pit 10 presented a potential health hazard to personnel who would be applying grouting materials. Also, continuous use of Pit 10 would limit our observation and inspection of the applied sealant on the joints.

By October 25 we had obtained some bentonite and an initial application was tried by Jody Valdez, P.E. (Zia Soils Engineer). I also applied some bentonite slurry to joints inside Pit 25. The bentonite slurry was very wet (excess water was present). The intent was to get a consistancy of bentonite that could later be used with mechanical equipment, and to determine the physical properties of the bentonite. This bentonite slurry was applied by hand. Inspection 3½ hours later revealed that it had dried up to a point of forming a cracked pattern. Upon further desiccation the bentonite shrank until its volume was reduced by approximately 6 to 10 times its original state; the bentonite was falling out of the joints.

I then decided to forgo the option of having Zia rent mechanical equipment (approx. $40 per hour) or buy equipment (gunite machine, approx. $40K), and to further test the bentonite with different moisture contents.

We selected several open joints and fractures on the north and south wall of Pit 25 that were open several inches. The outlined procedure was followed.

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TO: Virginia L. Christy, LS-6 -- DATE: November 28, 1979

THRU: T.K. Keenan, H-7 Group Leader

THRU: John Warren, H-7

Preparation of Bentonite Slurry

1) Mixed a quantity (approx. 2 ft.^{3}) of bentonite with water (10% by weight), found it was difficult to mix and most of the bentonite remained dry and in a powdered form.

2) Continued to add water until a stiff workable mixture of bentonite was obtained (approx. 60% water by weight). The mix resembled a stiff dough.

Preparation of Joints in Pit 25

1) Joints and fractures that were open 2 inches or more where selected and the loose material was removed.

Application of Bentonite Slurrry In Pit 25

1) The bentonite dough was hand packed into the test joints and fractures.

Observations

The bentonite on the north wall (sunny side) rapidly dryed, caked, slumped off, and fell out of the joints. The bentonite was still moist in the middle of the cakes but they continued to shrink and break up. Bentonite on the south pit wall (shady side) was frozen and did not appear to do much. In some places it had thawed and had broken and formed the cracked pattern.

Conclusion

Addition of moisture to the bentonite is required to soften and "liquidize" the mixture so that mechanical equipment can operate properly. The added moisture, however, is undesirable because of the degree that the bentonite slurry will not stay in place in the pit wall joints and fractures. As the bentonite slurry dries it shrinks, cracks, and falls out of open joints. Therefore, we presently plan to continue to follow our procedure of using tuff as the sealant and filler in the joints and fractures of the waste disposal pit walls. We feel that in doing so we have met requirements on sealing joints and fractures in pit walls and are in compliance with the "USGS and LASL Guide lines for Pit Construction Section IV, Subsection G." We still are open to further suggestion, however, regarding practical and safe alternate means of side wall fracture filling.

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TO: Virginia L. Christy, LS-6 .. DATE: November 28, 1979

THRU: T.K. Keenan, H-7 Group Leader

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