

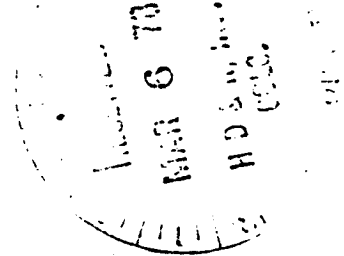


# United States Department of the Interior

BUREAU OF RECLAMATION  
ENGINEERING AND RESEARCH CENTER  
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BUILDING 67, DENVER FEDERAL CENTER  
DENVER, COLORADO 80225

MAR 3 1978

IN REPLY  
REFER TO:1000  
360.



Mr. John P. Horst, Environmental Engineer  
Henningson, Durham and Richardson Engineers  
310 Capitol Life Center  
Denver, CO 80203

Dear Mr. Horst:

In answer to your request last week, I am enclosing a draft copy of the Bureau of Reclamation "Specifications for Buried PVC Pond Lining." While these specifications are not final, they should give you a good idea of the criteria considered important by the Bureau in lined pond construction.

In our conversation last week, you also asked for our views on several proposals for land treatment and storage of municipal sewage effluent in and around Grand Junction, Colorado. Following is a brief discussion of those alternatives:

1. Land Treatment or Irrigation with Treated Effluent Above the Government Highline Canal

From our limited exposure to irrigation with sewage effluent, generally we see few problems with the mechanics of the irrigation or the biological impacts of such an operation. However, we would recommend against any irrigation of previously unirrigated land above the Government Highline Canal in Grand Valley.

That area of the Grand Valley is underlain by Mancos Shale or shale derived materials. Any water passing through the root zone of the soil profile in that area will come in contact with those salt-rich deposits, dissolve salt from the shales, and transport the salt to the Colorado River. The main purpose of our Grand Valley Unit of the Colorado River Basin Salinity Control Project is to prevent or minimize that flow of water through the soil profile and into the river by lining canals and laterals (to prevent seepage), promoting more efficient irrigation through an Irrigation Management Services program (to reduce deep percolation) and reducing deep percolation from irrigation in the valley with the Soil Conservation Service on-farm improvement program.



The irrigation of new or additional lands above the Government Highline Canal with sewage effluent would introduce more water to the soil profile above the Mancos Shale formations and increase the salt load being discharged to the Colorado River. As you can see, this irrigation would partially or totally negate results from our salinity control program for the Grand Valley.

2. Land Treatment or Irrigation with Treated Effluent Below the Government Highline Canal

In considering the use of sewage effluent for irrigation below the Government Highline Canal in the Grand Valley, several assumptions must be made:

- a. The lands to be irrigated are already being irrigated;
- b. The water currently being used for irrigation of those lands would not be used for the irrigation of new lands; and
- c. Irrigation with sewage effluent would be subject to the programs now being proposed for salinity control in the valley - canal and lateral lining, irrigation management for better efficiency, on-farm improvements, etc., i.e., current water use rates and practices (as reported by the SCS) could not be followed.

Based on these assumptions, we would not recommend against such an operation. From a cursory review, it appears that such land treatment with sewage effluent would be compatible with our salinity control plans for the Grand Valley.

However, if any of these conditions outlined above are not part of that land treatment program, we would recommend against its implementation. A higher salt discharge to the Colorado River from the Grand Valley would result, negating a portion of the salinity control benefits afforded by our Grand Valley Unit.

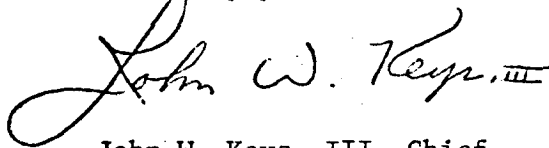
3. The Use of Lagoons or Holding Reservoirs

The installation of unlined lagoons or holding reservoirs in Grand Valley would have much the same effect on salinity contributions to the Colorado River as unlined canals and laterals. The water seeping from the ponds would percolate to the underlying shales and carry dissolved salts into the river. Therefore, we would recommend that any lagoons or holding reservoirs constructed for sewage disposal in Grand Valley be lined and made as impermeable as practicable. The enclosed draft specifications for buried PVC lining outline Bureau requirements for those materials and installation procedures.

The only situations that may warrant leaving lagoons unlined would occur when the ponds are located fairly close to the river or when they could be constructed directly on or in an impermeable material. Seepage from those ponds located close to the river would likely be directly to ground water of the river alluviums or the distance and time of travel across the shale would be very short. It should be remembered that other considerations may govern the suitability of such pond or lagoon construction close to the river, besides salinity control.

Mr. Horst, our discussions above have been necessarily general because of the lack of site-specific data on land-treatment proposals for sewage effluent in the Grand Valley. I hope this material is useful and answers your questions on our salinity control project in that area. If you have further questions, feel free to call me again.

Sincerely yours,

A handwritten signature in cursive script that reads "John W. Keys, III". The signature is written in dark ink and is positioned above the typed name.

John W. Keys, III, Chief  
Colorado River Water Quality Office

Enclosure