Minnesota Pollution Control Agency

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

August 27, 2003

Commanding Officer
Southern Division
Naval Facilities Engineering Command
Attn.: Dan Owens, Code ES32
P.O. Box 190010
North Charleston, SC 29419-9010

RE: Naval Industrial Reserve Ordnance Plant Superfund Site

Dear Mr. Owens:

The Minnesota Pollution Control Agency (MPCA) staff has reviewed the report entitled, "Anoka County Riverfront Park - Vegetable Oil Pilot Scale Study Investigation of Monitoring Well MS-53PC," dated August 21, 2003 and the report entitled, "Microbial Analysis Report," dated July 23, 2003. The reports are for the Naval Industrial Reserve Ordnance Plant (NIROP) Superfund Site was submitted pursuant to the Federal Facility Agreement, dated March 27, 1991, between the MPCA, the U.S. Environmental Protection Agency (U.S. EPA), and the U.S. Navy (Navy).

The MPCA staff hereby approves the reports with modifications identified in Attachment I of this letter for the report entitled, "Anoka County Riverfront Park – Vegetable Oil Pilot Scale Study Investigation of Monitoring Well MS-53PC."

If you have any questions regarding this letter, please call me at (651) 296-7818.

Sincerely,

David N. Douglas, Project Manager
Superfund Unit 2
Superfund Section
Majors and Remediation Division

DND:csa

cc: Dan Owens, U.S. EPA (w/enclosures)
Venky Venkatesh, CH2M Hill (w/enclosures)

Attachment I

Modifications to "Anoka County Riverfront Park – Vegetable Oil Pilot Scale Study Investigation of Monitoring Well MS-53PC," Dated August 21, 2003

1. **IV. Conclusions and Recommendations, page 3** - It is stated in the conclusions that "...there is some sediment present in the bottom of MS-53PC..." Earlier in the report it is stated that high levels of iron in MS-53PC suggest that colloidal iron may have settled in the bottom of the well. Also high iron levels were observed in three injection wells which may indicate that colloidal iron may have also have settled in the screen interval of the injection wells. It is known that iron in various forms is reactive with trichloroethylene (TCE) - and possibly other volatile organic compounds - and that reductive dechlorination may result. The colloidal iron in these wells may react with organic compounds in ground water and affect the sampling results for organic compounds. The conclusions should be modified to more specifically reference that sediment found in wells may be composed of colloidal iron rather than natural sediment.

   The recommendations should be modified to include a statement that residual colloidal iron particles accumulated in the well screen in monitoring well MS-53PC (and all other pilot scale study wells where colloidal iron was found) should be removed from these wells. The recommendations should be modified to include sampling of MS-53PC for iron levels after redevelopment to determine whether or not colloidal iron has been removed from the well. If iron levels in the well remain elevated, additional redevelopment of the wells should be performed until iron levels are lowered to levels considered natural for the Prairie du Chien Aquifer (assume that you are measuring Fe +2 in water).

2. **Possible Effects of Colloidal Iron on the Pilot Scale Study** - It is commonly known that iron compounds can be reactive with TCE and that reductive dechlorination of TCE may occur when ground water containing TCE contacts iron compounds. A journal article entitled Abiotic Reductive Dechlorination of Chlorinated Ethylenes by Iron-Bearing Soil Materials. 2. Green Rust by W. Lee and B. Batchelor, Environmental Science Technology., 36 5348-5354 documents the potential impact of iron compounds on TCE. At the Anoka County Riverfront Park Vegetable Oil Pilot-Study Area, colloidal iron was mixed with vegetable oil prior to injection. The colloidal iron was added to help the United States Geological Survey (USGS) track the distribution of vegetable oil in the pilot scale area. The results of the USGS work have not been made available to date.

   Since iron compounds can be reactive with TCE, it may be possible that some of the reductive dechlorination in the study area may be due to reaction with iron compounds introduced into the aquifer with the oil. The MPCA staff requests that, in the Vegetable Oil Pilot-Scale Final Report, the Navy evaluate the impact that the addition of colloidal iron on the pilot scale results. Some of the questions that come to mind that need to be answered are as follows: Is some observed reductive dechlorination in the pilot study area due to the presence of colloidal iron in the aquifer?

Does the introduction of colloidal iron complicate the evaluation of the effectiveness of the reductive dechlorination of TCE by the vegetable oil? Would the rate of reductive dechlorination of TCE be as high if the vegetable oil had not contained colloidal iron? Will colloidal iron need to be mixed with vegetable oil for a full scale application to achieve the reductive dechlorination rate achieved in the pilot scale test? How will this affect the cost of full scale implementation if that is undertaken?