



# Bechtel

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CLEAN II Program  
Bechtel Job No. 22214  
Contract No. N68711-92-D-4670  
File Code: 0218.5

**IN REPLY REFERENCE: CTO-0080/0189**

February 12, 1997

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Building 128  
1220 Pacific Highway  
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**Subject: Groundwater Monitoring Data Presentation Software, Marine Corps Air Station, El Toro, California**

Dear Mr. Piszkin:

We have reviewed the issues associated with the graphic presentation of long-term groundwater monitoring data. The objective of our effort was to determine what means are readily available to produce graphic presentations of data which would be similar to those included in the 30 September 1994 document developed by SWDIV through the CLEAN I contractor. The product from CLEAN I was well-received by the regulatory agencies; however, the necessary programming code associated with the CLEAN I product has not been made available to CLEAN II and consequently other options are being explored.

### *External Product Review*

Our review began with two software packages developed by others and available for purchase. We examined Geotechnical Groundwater Graphics 4.0 Groundwater Module (G2G) and the Monitor System™. Only the literature for these materials were reviewed because the demonstration software provided by the vendors would not run.

Of the two, G2G appeared to be better. It provides for various graphs and tables to be printed on the same page. It can also generate geochemical Stiff diagrams. A significant limitation is that the output is printed on separate pages and cannot be automatically printed on a single page as was the CLEAN I document. The product is not capable of producing a site map or borehole log. The Monitor System™ is capable of producing statistical analyses as well as many of the outputs of G2G; however, it cannot generate Stiff plots. Neither product offers the capability to even approach the presentation format of the original CLEAN I report.



**Bechtel National, Inc.** Systems Engineers-Constructors

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### ***In-House Capability Review***

We also examined our in-house capabilities to ascertain if we possessed software that could create the requisite log-normal plots and permit exportation to a standard electronic format in order to combine the output with other graphics like maps.

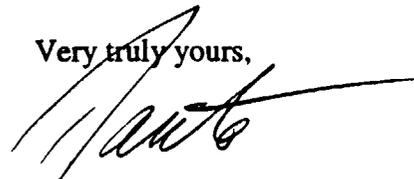
Relevant software possessed by BNI (Statistica and GEO-EAS) are very good at producing accurate graphs but use a proprietary format which cannot be exported to a readable standard format. In some other cases, as with Microsoft Excel, other software such as CorelDraw is necessary to translate the image to a standard graphics format like DXF. We experimented with Statistica and translated one of the Statistica graphs to a standard image format readable by our ARC/INFO Geographic Information System (GIS). The quality of the translation was not too good. Excel graphs looked a little better. The Excel graph was easily imported to GIS and can be part of a layout somewhat similar to the CLEAN I report.

### ***Recommendations***

Currently it is feasible for CLEAN II to produce a report similar to the CLEAN I document but the operation will not be automatic, at least until the process is defined and all the needed components are in place. There would be continuing development costs associated with such an effort. The Excel→CorelDraw→GIS or CAD solution appears to be reasonable and uses software which CLEAN II already has. We would need to write several small scripts (macro-like directions) to expedite the process.

In summary, we believe that it is feasible to generate a report which would meet both Navy and regulatory agency expectations. We would be pleased to discuss these options as well as your comments and ideas on this topic. Justification for the time invested up-front to develop and fine tune the scripts may be attributed to the large amount of data to be reviewed over several years.

Very truly yours,



Dante J. Tedaldi, Ph.D., P.E.  
CTOL

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