Enhanced Decision Making Using an Environmental Information System

NAS DALLAS

Project Summary

Naval Air Station (NAS) Dallas occupies 877 acres in the center of the Dallas-Fort Worth metropolitan area. In 1993, the Base Realignment and Closure (BRAC) commission recommended NAS Dallas for closure. SOUTHDIV's CLEAN III contractor, TtNUS, commenced work at the site in early 1998 to complete the RCRA Facility Investigation (RFI) and to perform post-RFI services. In addition, environmental baseline survey and finding of suitability documents have been completed to support transfer of over 700 acres of property to date. Over 450 environmental areas of concern are being addressed. Managing the substantial amount of data associated with these areas in an Environmental Information System using a Geographic Information System (GIS) and Internet applications has significantly enhanced decision making.

Regulatory Requirements/Community Involvement

The Texas Natural Resource Conservation Commission issued a draft RCRA Permit (Permit No. HW-50276-000) for NAS Dallas in February 1992. Site closure tasks are being completed in accordance with the RCRA Corrective Action process. Transfer of property is being completed in accordance with the requirements of CERCLA 120 (h)(3). The management of environmental data is being used to support both the RCRA and CERCLA regulatory requirements at the site and to effectively communicate site conditions at BRAC Closure Team (BCT) and public meetings.

Challenges

During the RFI/CMS and Base Realignment and Closure (BRAC) activities at NAS Dallas, nearly 2 gigabytes of electronic information has been collected. This information includes base mapping, digital photographs, and chemical, geological and hydrogeological data from over 1,200 sampling locations. The information is stored within an Environmental Information System that is primarily based on an ArcView GIS, but has grown to encompass many alternative software applications.

Components of the NAS Dallas Environmental Information System:

- ArcView GIS system that integrates relational databases, mapping, imagery, and movie files.
- High-resolution aerial photography, both historical and current.
- ArcView mapping hot-links to descriptions of buildings and SWMUs, geologic cross-sections, and hundreds of field photographs taken with a digital camera.
- Customized ArcView menus and buttons that allow the user to zoom to a specific site, select a specific view, launch new project files, and instantaneously extract chemical data for selected sample locations.
- NAS Dallas Internet site that links to analytical querying interfaces and ArcView GIS mapping served by ESRI's Internet Map Server.
- Three-dimensional modeling of contamination and geology using Ctech's Environmental Visualization System (EVS).
- Animation of three-dimensional geostatistical models in Avi format using Adobe Premiere.

Site/Location:	NAS Dallas Dallas, TX
Site Description:	Naval Air Station
EFD/EFA Contact:	Dudley Patrick (SOUTHDIV), 843-820-5541 Joel Murphy (SOUTHDIV), 843-820-5577
Contractor Contact:	Patrick Hooper (TtNUS), 412-921-8250
Technology:	ArcView GIS Visual FoxPro Data Management System Avenue Programming Language Internet Site ESRI's Internet Map Server Portable Document Files Ctech's Environmental Visualization System (EVS) Geosoft Avi Format Using Adobe Premiere Adobe Acrobat Exchange
Contaminant:	Various
Action Levels:	Texas Risk Reduction Rules
Legal Driver:	Resource Conservation and Recovery Act (RCRA) Permit No. HW-014
Decision Document:	NA

Figure 1: ***Geostatistical map showing action level exceedances.***

- Two-dimensional kriging of contamination data using Geosoft and EVS.
- Generation of electronic documents in PDF format via Adobe Acrobat Exchange.

Cost Avoidance Measures

- Hard copy reports, especially voluminous appendices, have been converted into electronic [portable document file (PDF)] format and distributed to NAS Dallas team members on CD-ROM thereby eliminating copying costs.
- The EIS enhanced decision making allowed for the completion of six RFI reports within ten months, thereby allowing property to be made available for transfer.

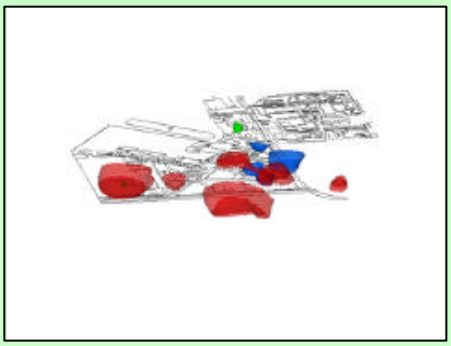

Figure 2*: EVS output showing soil concentrations.*

Project Successes

The following helped enhance decision-making and save overall time/cost:

- The ArcView GIS, which stores output from a Visual FoxPro data management system, allows the user to query and spatially display environmental data for the entire facility.
- The GIS is operated by the BCT as an interactive presentation tool (facilitates visualization) during BCT and public meetings.
- Customization of the ArcView GIS, via the Avenue programming language, facilitates the retrieval and presentation of information.
- An NAS Dallas Internet site provides up-to-date postings of relevant information and documents.
- Links from the Internet site include an analytical querying interface and an on-line ArcView GIS served through ESRI's Internet Map Server.
- Output from the ArcView GIS is used to model site contamination and geology in two and three dimensions.
- Three-dimensional models have been animated in Avi format and presented at public meetings. In addition, the ArcView GIS is used to output figures for RFI/CMS reports.

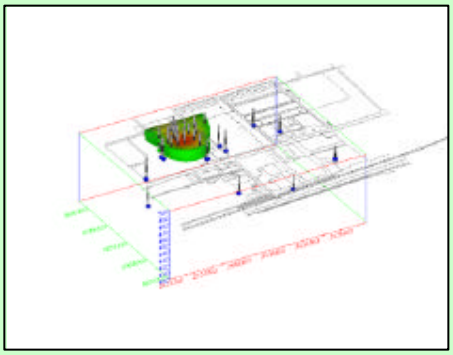

Figure 3: ***EVS output showing groundwater concentrations.***

Lesson Learned

One of the primary reasons for the success of the NAS Dallas EIS was the planning that took place prior to its implementation. A Site Data Management Plan (SDMP) was developed to outline the data flow process, sample tracking procedure, Electronic Data Deliverable (EDD) requirements for analytical and survey data, the EIS data structure, as well as the software to be used for the various outputs of the EIS. The SDMP allowed the field team, technical staff, project managers and subcontractors to understand their data requirements such that EIS development, integration and output could be expedited to meet the demanding schedule of the RFI reports.

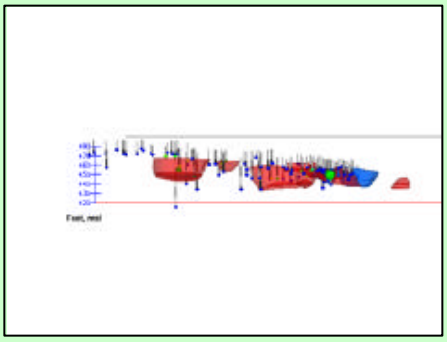

Figure 4: ***Cross section of an EVS groundwater output.***