



INTEGRATED
Environmental Services, Inc.



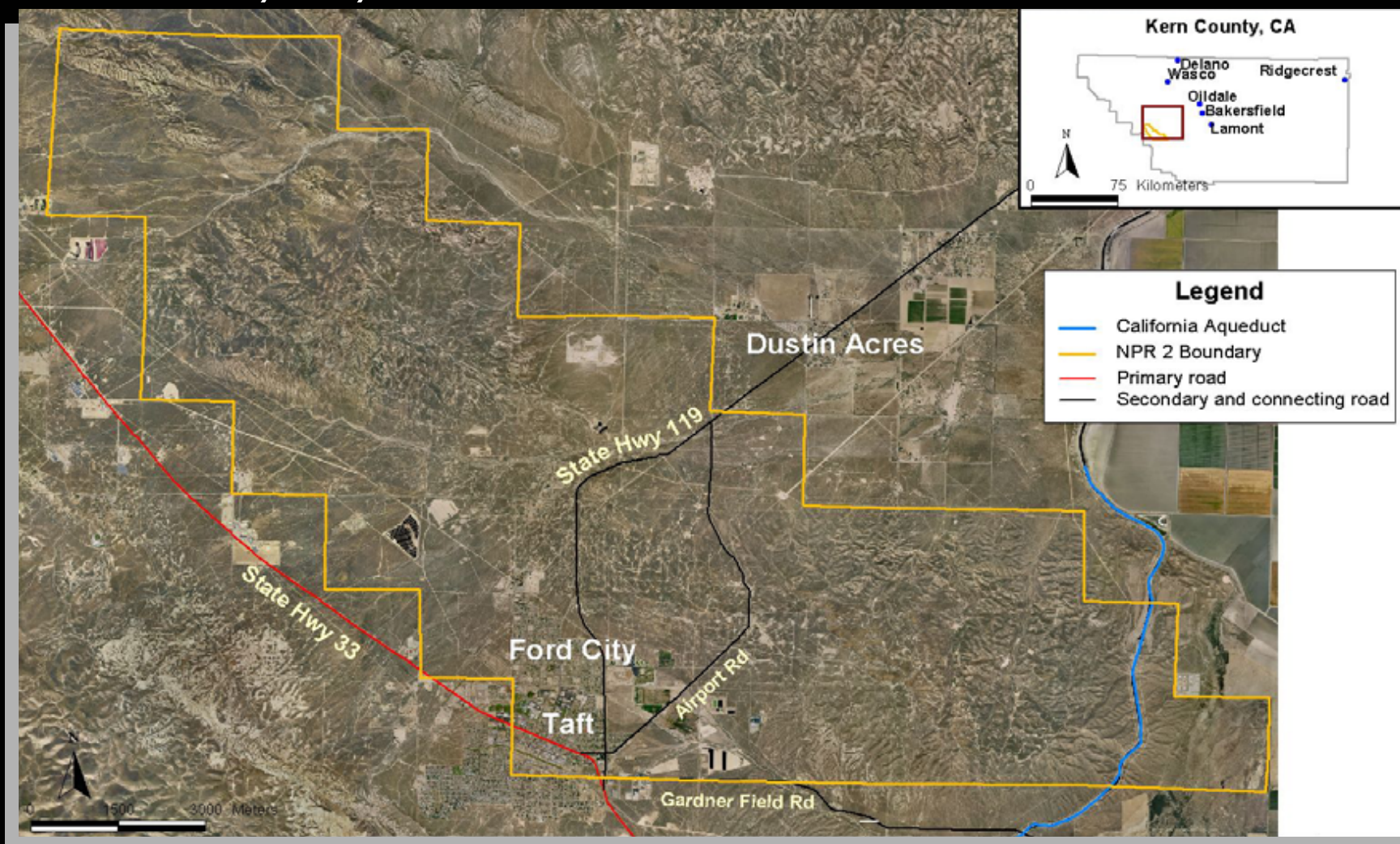
**Application of a web-based
Environmental Data
Management System
at
The Department of Energy's
Naval Petroleum Reserves No.2**

Agenda

- ◆ NPR-2 Background
- ◆ Overview of webEDMS
- ◆ Application of webEDMS to NPR-2
- ◆ Creation of Legacy Data Management System using webEDMS
- ◆ Value-Added Benefits

NPR-2 Background

- Established in 1912, NPR-2 consists of 30,000 acres located in the southern San Joaquin Valley, approximately 25 miles southwest of Bakersfield, CA;



NPR-2 Background

- ◆ NPR-2 contains *insitu* oil and gas reserves;
- ◆ DOE administers oil and gas activities on NPR-2;
- ◆ Public Law No. 105-261 (1996) laid the framework for the proposed transfer of the NPR-2 from DOE to BLM;
- ◆ 15 current lessees — formerly major oil companies, now small independents
- ◆ Operations:

100's of wells	Oil and gas meters
Gauging facilities	Tank settings
Sumps	Buildings
Transport pipelines	Storage and equipment yards
Dehydration plants	Compressor stations

Environmental Requirements

- ◆ Based on Interagency Agreement between DOE and BLM, DOE responsible for environmental conditions that exist up to the transfer date;
- ◆ Before the transfer, Federal government needed to know the site conditions so that an environmental cleanup account could be setup and funded;
- ◆ No comprehensive environmental surveys had been conducted on NPR-2, thus a Phase I ESA was necessary.



Phase I ESA and Recommendations

- ◆ ICF conducted a Phase I Environmental Site Assessment (Phase I) on NPR-2 in Fall 2003;
- ◆ Key recommendation of Phase I was for the completion of a field reconnaissance of NPR-2 to identify and inventory oil field features and related environmental conditions;



The Challenge

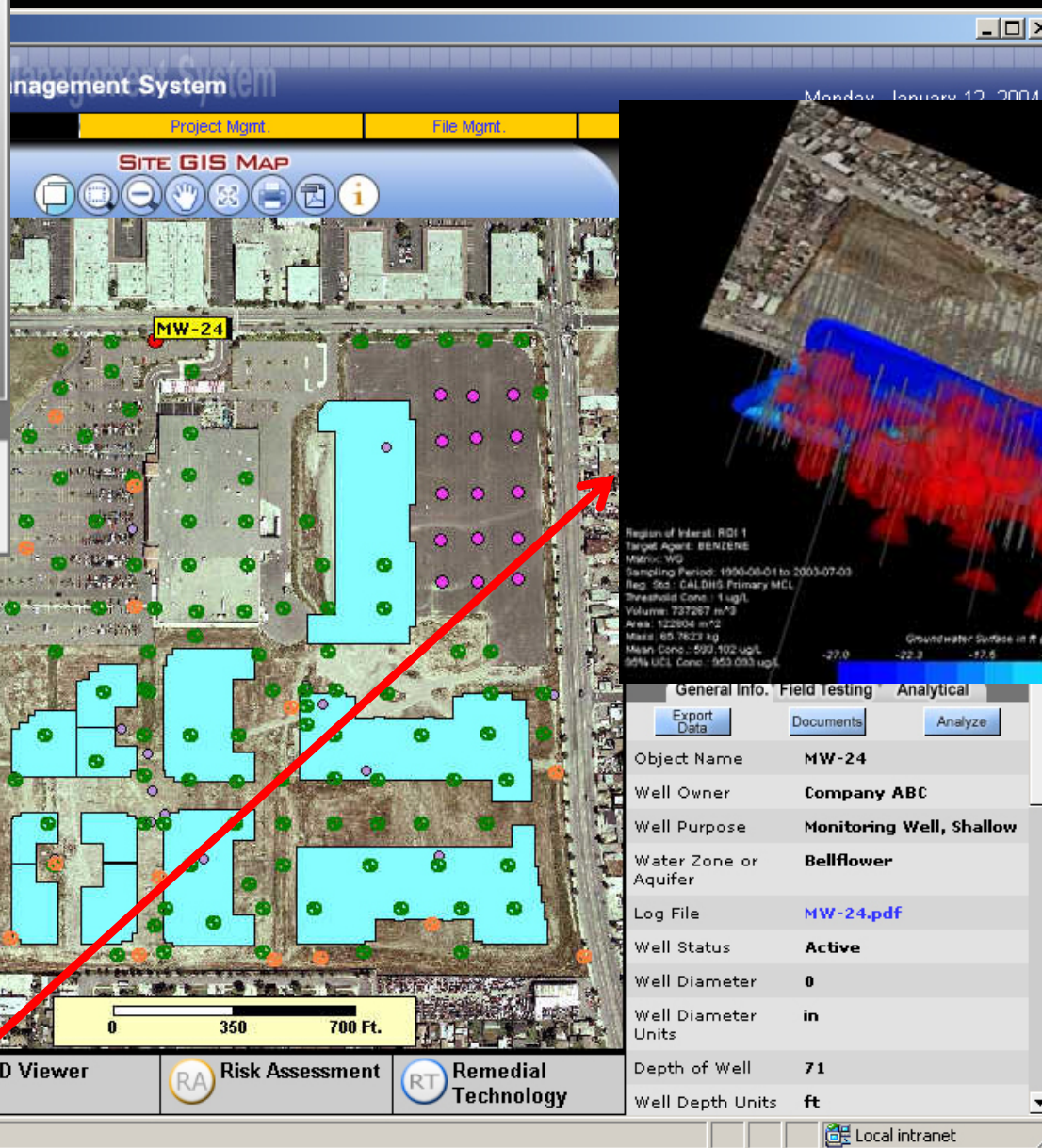
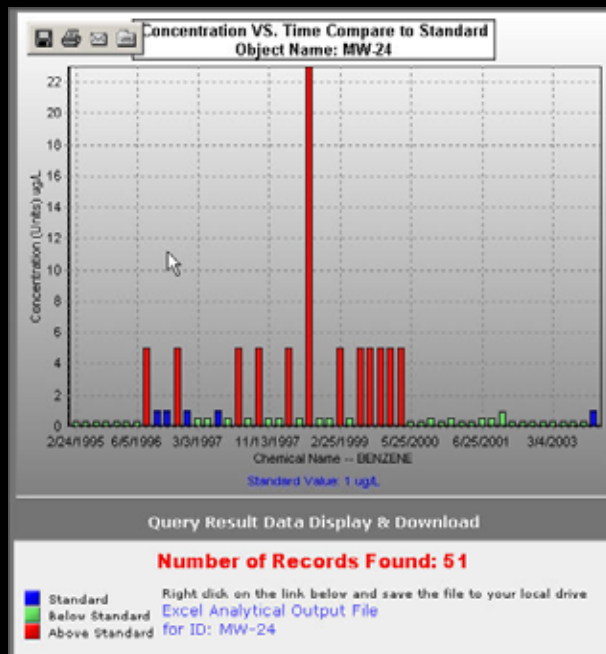
- ◆ The field reconnaissance needed to be completed in a timely and cost-effective manner;
- ◆ Traditional survey methods using maps and notebooks not suited to the project because:
 - size of the site
 - time and budget constraints
- ◆ Needed a process that would:
 - facilitate the acquisition of field data,
 - allow for near real-time viewing of field findings,
 - allow for the offsite management of the field team,
 - allow for the establishment of a site-wide environmental baseline,
 - allow managers to use the field data to develop remedial cost estimates, and
 - establish a long term and easily accessible legacy data repository



The Tool

- ◆ IESI developed a web-based environmental data management system (webEDMS) to manage remediation projects;
- ◆ webEDMS is a web-based tool that facilitates the RI/FS process by:
 - allowing geographically dispersed stakeholders to retrieve, sort, and analyze project data, documents and photographs via GIS front end module,
 - allowing the user conduct 3D visualization of site conditions, and
 - allowing the user conduct human health risk assessment screening

webEDMS



Refining The Tool

Adding Electronic Data Collection

- ◆ A 100% electronic field data collection program was developed to seamlessly upload field data to webEDMS
 - Field data was uploaded to webEDMS daily.
 - Trimble GeoXT – sub-meter accuracy hand held GPS with integrated PDA
 - Data Dictionary was developed for rapid and consistent entry to the PDA. It contained:
 - a list of anticipated oil field features
 - pull down menus to log feature attributes
 - Digital Cameras were used to photo document site features
 - Photos were linked directly to the features in the shapefiles



Field Reconnaissance Team Daily Activities

Daily Field Recon Tasks

Tailgate Meeting

- Review the day's recon area
- Discuss special features of interest
- Discuss any modifications made by the Project Manager



Field Data Collection Technicians (FDCT)

- Operated GPS units
- Collected feature attribute information (type of feature, condition, etc.)
- Photo-documentation of features



Field GIS/Data Processor (FDP)

- Update shapefiles for each feature of interest
- QC previous days field data
- Support Field Recon Crew
- Organized logistics of daily field reconnaissance transects
- Performed daily data backup

Post Field Recon Tasks



FDCT

- Give FDCT GeoXT units and pack gear
- Prep gear for next day's field recon

FDP

- Sends previous day's shapefiles and photo to home office
- Prep GeoXT maps for next day's recon

Home Office GIS/Data Tasks

GIS/Data Tech

- Uploaded and processed data transferred from FDP for display on webEDMS
- Performed secondary QA/QC on field data
- Managed webEDMS security and assigned passwords to off-site project team members



Applying The Tool

- ◆ Field work started 3rd week in May 2003;
- ◆ Daytime temperatures already in high 90s and low 100s;



- ◆ Work day altered to take advantage of relatively cool mornings;
- ◆ Original crew consisted of 3 FDCTs and 1 FDP;

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GIS & Data

Environmental Data Management System

SELECT MAP LAYERS

Select an Active Layer
Turn Layers ON/OFF

- ☒ Pipeline
- ☒ Accumulation Site
- ☒ Surface Dump
- ☒ Trash Scatter
- ☒ Facility
- ☒ Building
- ☒ Concrete Pad
- ☒ Misc. Feature Point
- ☒ Misc. Feature Area
- ☒ Misc. Photograph

SITE GIS MAP

6DSW_OTHERPT_244

0 200 400 m

OBJECT SEARCH

Search

OBJECT FINDER

6DSW_OTHERPT_244

SL Site Location Map

PS Project Statistics

FC Feature of Interest Criteria

PC Project Completion Timeline Animation (AVI File 26.5 MB)

Country: USA

OBJECT DATA 6DSW_OTHERPT_244

General Info.

Feature:	Misc
Alias:	6DSW_OTHERPT_244
Section ID:	6D
Lessee:	Nuevo
Description:	Leaking oil from pipe into catch basin
Comment:	Pipe broken, oil leaking
Photo Direction:	NA
Date:	2003-05-28
Photo Link:	536.jpg

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SELECT MAP LAYERS

Select an Active Layer
Turn Layers ON/OFF

Clear Layers Reset Layers

FEATURE OF INTEREST

- ☐ Oil Well
- ☐ Potential Impact (Line)
- ☐ Potential Impact (Poly)
- ☒ Sump
- ☒ Catch Basin
- ☐ Electric Transformer
- ☐ Survey Benchmark
- ☐ Tanks
- ☐ Tank Setting
- ☐ Condensate Tank

OBJECT SEARCH

Search

OBJECT FINDER

Environmental Data Management System

GIS & Data

SITE GIS MAP

Country **USA**

Status: **UNK**

Perimeter Control: **Free Access**

Signage Posted: **No**

Estimate Area: **5,000-10,000 sq ft**

Estimated Depth: **<5 ft**

Estimated Spill Area: **None**

Photo Link: [26.jpg](#)
[27.jpg](#)

Photo Direction: **26NE,27NE**

Comment: **Old tires disposed of in basin, some rolled down to lower catch basin.**

GPS Area (sq ft): **9015.01**

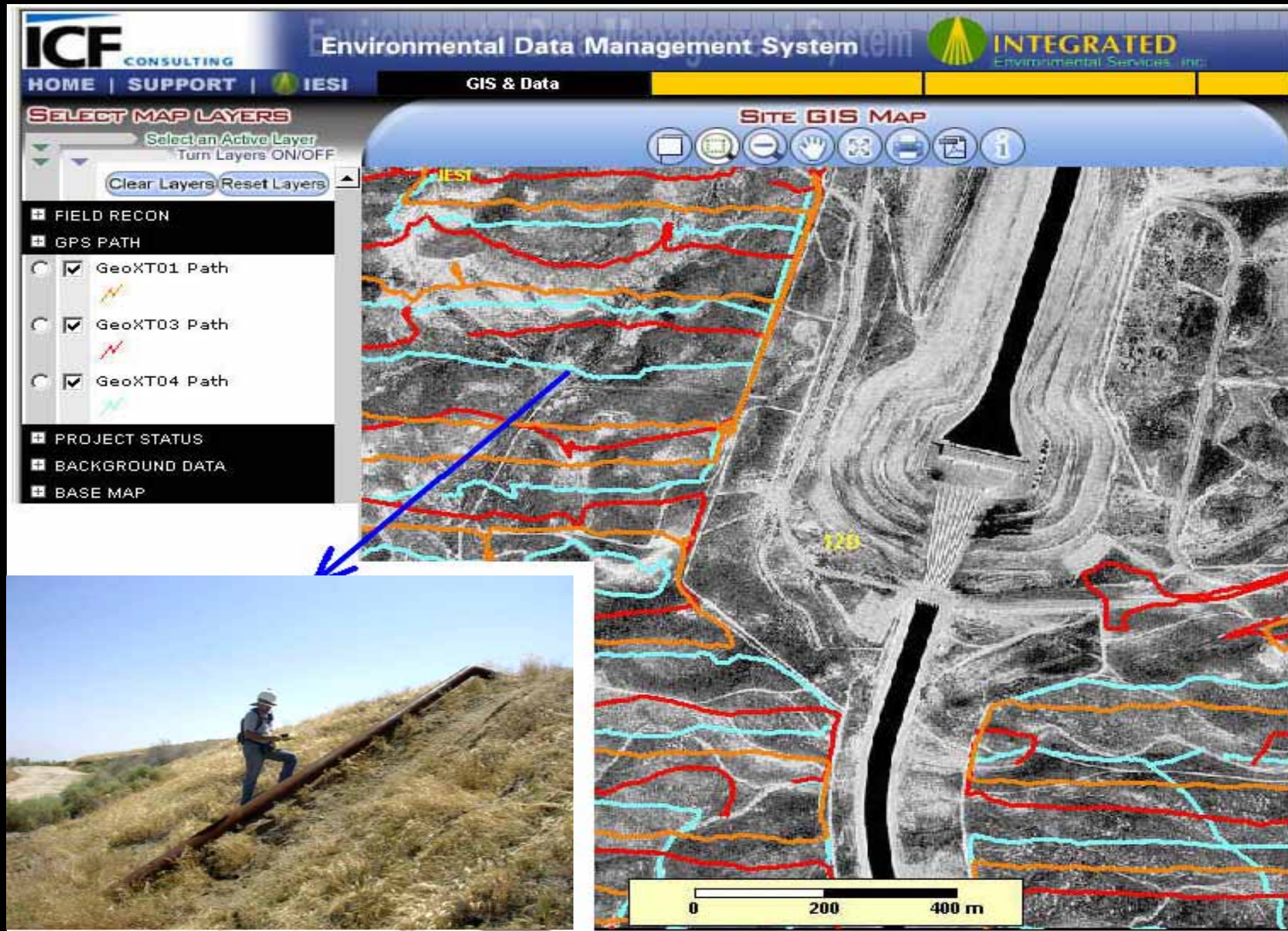
GPS Acres: **0.21**

SL Site Location Map

PS Project Statistics

FC Feature of Interest Criteria

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Environmental Data Management System

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GIS & Data

Tuesday, June 01, 2004

SELECT MAP LAYERS

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FEATURE OF INTEREST

- ☐ Oil Well
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OBJECT SEARCH

 [Search](#)

OBJECT FINDER

SITE GIS MAP

SITE DATA

[General Info.](#) [Contact Info.](#) [Compliance](#)

Site Name	NPR2
Site Description	Buena Vista Oil Fields
Site Owner	US DOE
Site Operator	US DOE
Address	28590 Highway 119
City	Tupman
State	CA
Postal Code	93276
Country	USA

OBJECT DATA

None Selected

[General Info.](#)

Select "identify" and click on an object on the map to view it's associated data in this table

SL Site Location Map

PS Project Statistics

FC Feature of Interest Criteria

PC Project Completion Timeline Animation (AVI File 26.5 MB)

Project Statistics

- ◆ **NPR-2 total area:**
 - 30,000 acres
- ◆ **Distance walked by field reconnaissance team**
 - 750 miles
- ◆ **Number of historic features logged electronically**
 - 2,300 features
- ◆ **Number of supporting photographs acquired**
 - 5,000 photographs
- ◆ **Field reconnaissance project duration**
 - 44 days
- ◆ **Field reconnaissance data collection man hours**
 - 700 hrs



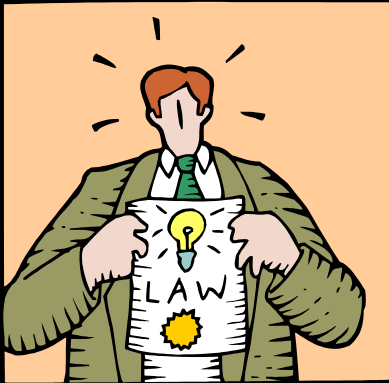
Using the Field Reconnaissance Data

- ◆ Primary purpose of the field reconnaissance was to:
 - Document and inventory oil field features and identify conditions of potential environmental concern, and
 - Develop cost estimates to complete remediation and restoration on NPR-2
- ◆ webEDMS greatly expedited this process by:
 - Providing a tool that allowed for the querying and sorting of field data by dozens of attributes.



Using the Field Reconnaissance Data

- ◆ Once the oil field features were sorted and categorized, remediation and restoration cost estimates were developed based on the following applicable regulations and requirements:
 - DOE
 - BLM
 - Division of Oil, Gas, and Geothermal Resources
 - State of California
- ◆ If no relevant government or regulatory standard existed for a particular condition, ICF applied industry standards or developed assumptions



Summary

- ◆ Federal government needed to understand magnitude of remediation and restoration liabilities on NPR-2 to support proposed transfer;
- ◆ DOE requested that ICF conduct a Phase I and follow-up field reconnaissance of NPR-2;
- ◆ ICF and IESI, an imminent DOE Mentor-Protégé partnership, joined forces to propose a novel approach for conducting large-scale field reconnaissance.



Summary – Cont.

- ◆ webEDMS was customized for use on NPR-2, which:
 - eliminated the need for conventional mapping and logging techniques
 - allowed for the digital collection of all field data
 - standardized naming of features and attributes
 - allowed stakeholders located across the country to view and analyze field data in near real-time via Internet
 - significantly reduced the time (hence cost) to complete the work
 - facilitated the development of remediation and restoration cost estimates

Value Added Benefits of webEDMS

- ◆ Federal government now has a legacy environmental data management system for NPR-2 that:
 - Is 100% digital (includes GIS and database components)
 - Is web-based
 - Is comprehensive in scope and detail
 - Is flexible (new GIS layers/data can be easily added)
 - Is highly photo-documented (~5,000 linked photos)
 - Is relatively inexpensive to maintain and manage
 - Allows for human health risk screening, if needed



Value Added Benefits of webEDMS

- ◆ To quote Anthony Dammer, Director of DOE's Office of Naval Petroleum and Oil Shale Reserves

"The use of digital technology in field reconnaissance work is going to be the norm at some point in the future. It was truly groundbreaking for DOE to be able to use such technology for a project of the magnitude as our NPR-2 field." 
- ◆ Jim Killen, Director of the Naval Petroleum Reserves in California (NPRC), which includes NPR-2 said

"The use of digital tools like the ones used on the NPR-2 assessment work really streamlined the whole process. Now we have a very good baseline of environmental conditions that will help us to be good stewards of this federal property." 

Contact Information

- ◆ For more information about webEDMS and electronic field data collection contact:
- ◆ ICF Consulting
 - Gary Clendenin
 - www.icfconsulting.com
- ◆ Integrated Environmental Services, Inc
 - Ron Gregg
 - www.iesinet.com