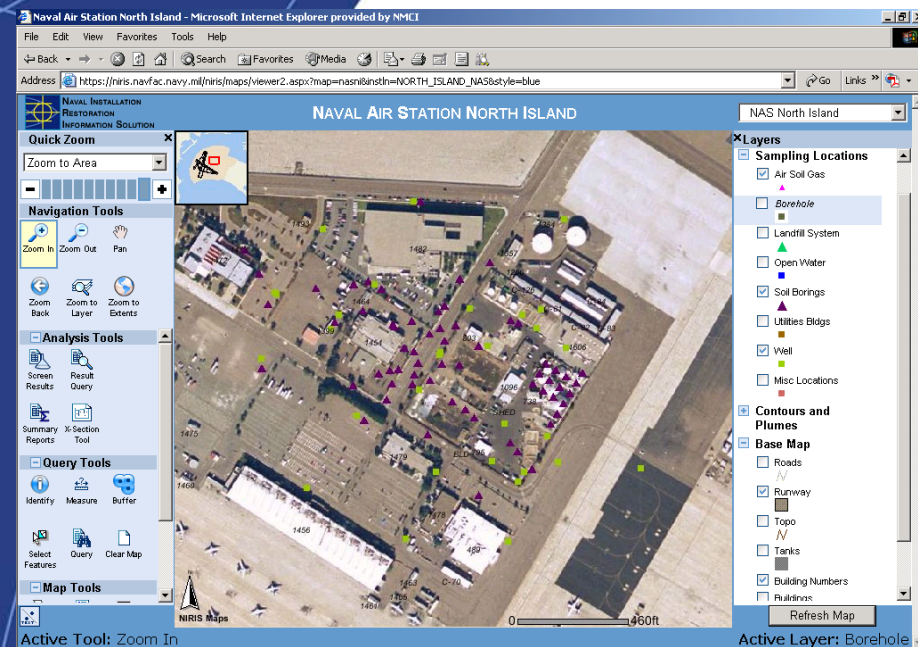


Naval Installation Restoration Information Solution

Rob Sadorra, MBA, MEng, PE
NAVAFAC Headquarters

Josh Fortenberry
NAVAFAC Engineering Service Center

Federal Remediation Technologies
Roundtable
Wed May20th, 2009



Agenda



- **Overview of Navy Environmental Restoration Program Needs**
- **NIRIS Components**
 - **NIRIS Database Network Components**
 - **Data Checker and NIRIS Electronic Data Deliverables (NEDD)**
 - **Visualization tools - Mapping**
- **Interoperability**
- **Summary**



Environmental Restoration Program Needs



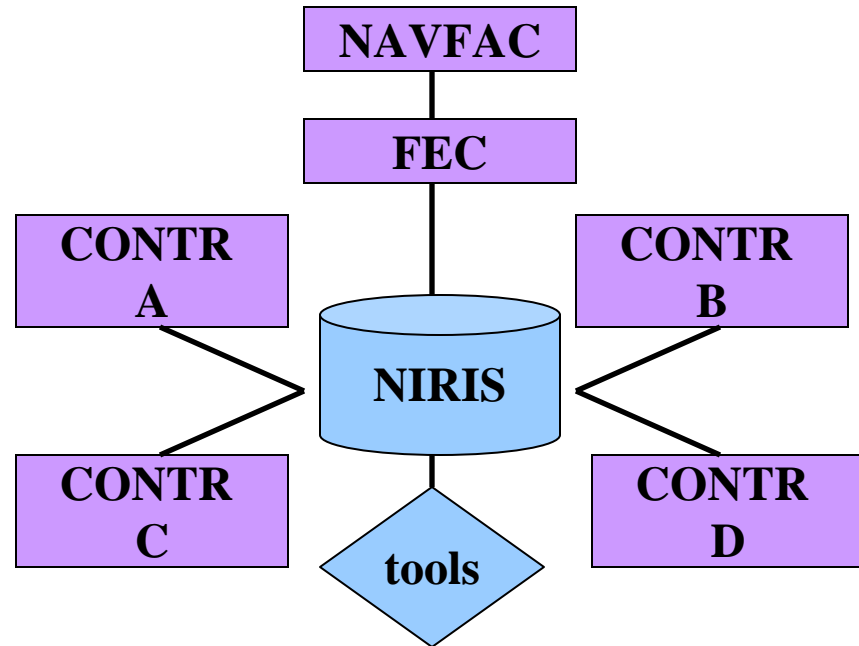
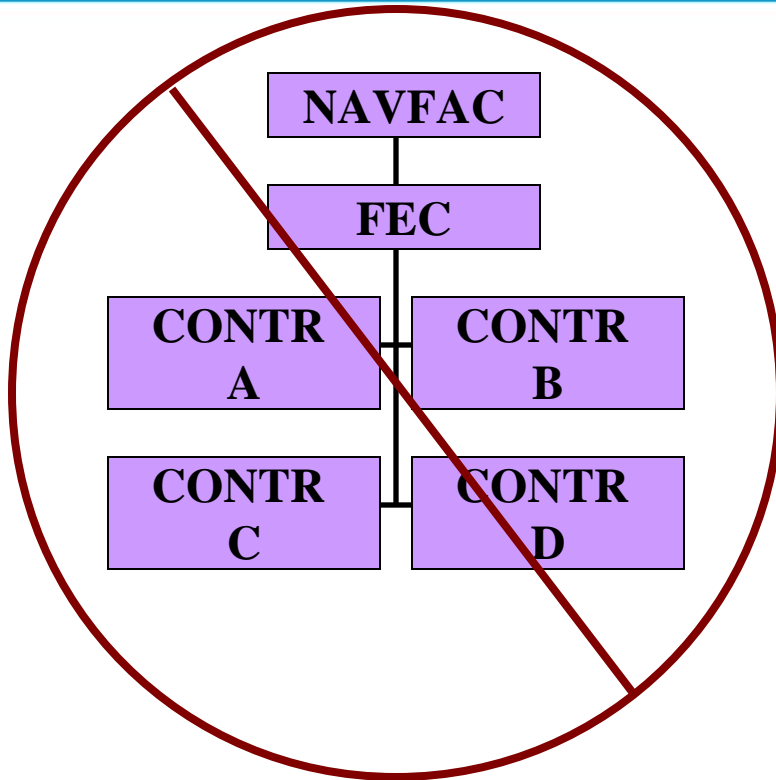
- **Improve our day-to-day data management**
 - **Data Management in the cleanup program is a complex process**
 - **Installation Restoration Program + Munitions Response Program includes nearly 4000 sites**
 - **About \$300 million per year, with nearly \$3.0 B Cost-to-Complete (CTC)**
 - **Involves several organizations participating in data collection, assessment, and evaluation of the information.**
 - **Several regional NAVFAC offices (NAVFAC Facility Engineering Commands – FECs)**
 - **Terra Bytes of data, 100s of users!**
 - **Previous Conditions**
 - **Data and documents maintained differently between FECs and maintained differently between contractors**
 - **Managing multiple data structures was extremely costly**
 - **When new contractors take over, data was lost**
 - **Paying for duplicate data**

Environmental Restoration Program Needs



- **Enhance the utilization of data with available tools and technologies**
 - Visualization and modeling of data for decision-making
 - Query, analysis and reporting of data
 - Collaboration with state and federal regulators
 - Faster availability of the data
- **Leverage other data sources**
 - Focus on environmental restoration data
 - Not in the business of base mapping

The NIRIS Concept



Two components of the *Solution*:

- The Data
- Tools and Business Processes

The NIRIS Concept

- The Data -



- **Definition of data needs**
 - Primarily related to field sampling events (i.e. analytical and field data)
- **Development of a standardized data structure that will be commonly used by all FECs and support contractors**
 - Enhance data integrity, and availability
 - Reduce cost of managing multiple structures
- **Compliance with DoD Spatial Data Standard for Facilities, Infrastructure, and Environment (SDSFIE)**
 - Facilitate integration with other data systems

The NIRIS Concept

- Processes and Tools -

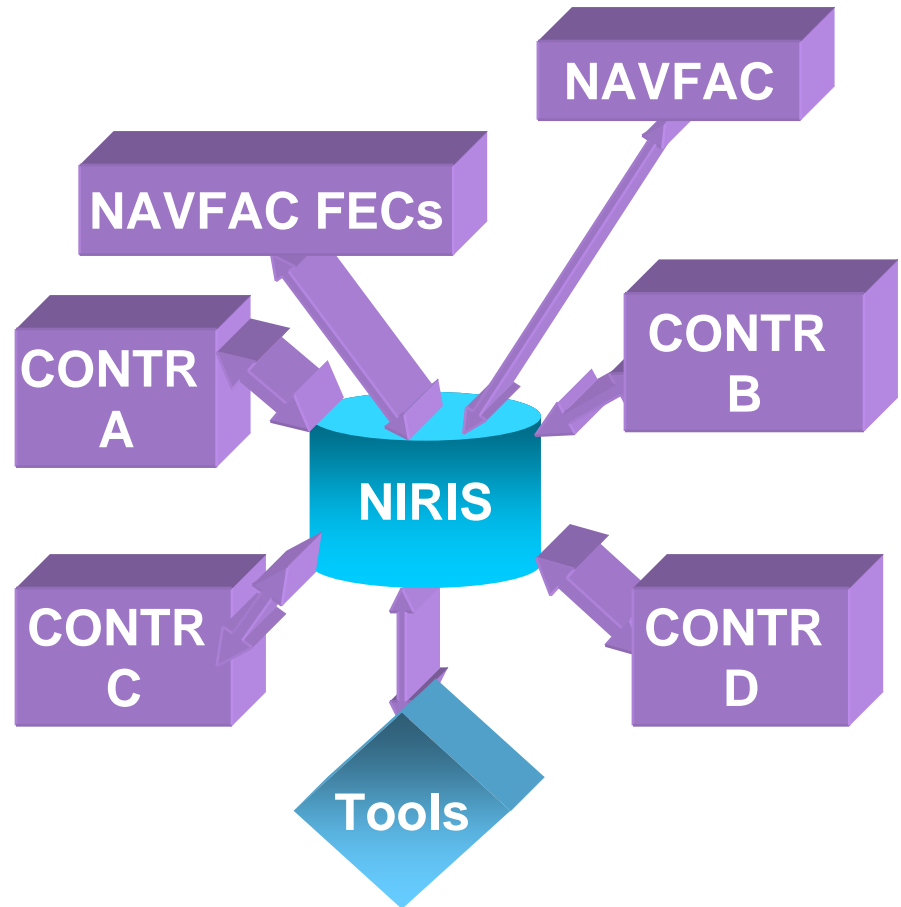


- **Process and Tools for inputting and managing data in the system**
 - NIRIS Electronic Data Deliverables (NEDD)
 - Labs, Contractors
 - Data QA/QC
- **Process and Tools for utilizing data**
 - Web based tools for collaboration, querying, analysis, reporting, and visualization of data
 - Export data to other applications – GMS, SURFER, etc.

NIRIS Concept



- **Central management of all Navy and Marine Corps ER project data, documents and records**
 - Environmental sample data
 - Munitions Response / Unexploded Ordnance Data
 - Spatial Data
 - Land Use Control Data
 - Documents and Reports
- **Tools to use data e.g., GIS**
- **Tools and policies to ensure only quality data gets loaded**
 - NIRIS Electronic Data Deliverabel (NEDD)
 - Data Checker



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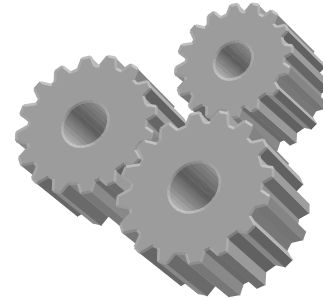


NIRIS Components



NIRIS database

- Stores tabular (analytical) data
- Stores ER specific spatial data



Tools to upload data

- Data Checker
- Validates NIRIS Electronic Data Deliverables (NEDDs)

Tools to extract and visualize data

- Query Tool (Analytical data)
- Web GIS (ArcIMS)
- Other tools (GMS, SADA, Surfer)

Environmental Document Management System (EDMS)

- Administrative Record, Post Decision, and Site File documents

Main component of NIRIS database

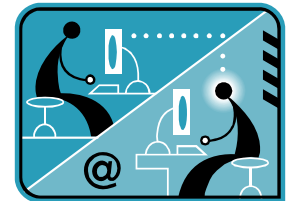
- Tabular
 - Updated daily (transactional)
 - Oracle 10g
 - Stores all ER data
 - Audit schema
- Spatial
 - Dynamically updated based on tabular
 - Database Link between tabular and spatial
 - Audit table to track changes, including deletions
 - Automatically triggered when tabular updated

Network Components – Navy Specific



- **Spatial data is managed using:**

- **Oracle 10G Enterprise (10.1.2) Geodatabase**
- **ESRI ArcSDE (Spatial Database Engine) V9.1**
- **Separate schema for each regional State Plane Coordinate System**
- **All schema use NAD 83**
- **!!Navy Marine Corps Intranet(NMCI) Compliant!!**



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NIRIS Ensures Only Quality Data is Loaded



Data Checker:

- Web based
- Ensures only complete data sets of known quality get loaded
- Flags potential errors for data submitter
- Not data validation

- **Submittal standard for contractors loading ER data**
- **Approximately 50 tables - 10 will be commonly used**
- **Specify precision, format for data fields**
- **Example NEDD tables:**
 - **Analytical Result**
 - **Borehole**
 - **Groundwater level**
 - **Sample**
 - **Quality Control**
- **SOP for use**

NEDD Tables



NEDD Tables

- Agency
- **Analytical Result**
- Aquifer
- Aquifer Test
- Biological Specimen
- Biological Survey
- **Borehole**
- Contractor
- Control Plan Role
- Environmental Measurement
- **Environmental Project**
- Environmental Zone
- Excavation
- Geologic Unit
- Geophysical Anomaly
- Groundwater Level
- Hydro Calculation
- Laboratory
- Land Restriction
- **Lithologic Description**
- Local Regulation
- **Location**
- Location Site
- LUC Implementation
- Measurement Site Zone
- Ordnance
- Owner
- Point of Contact
- Program Contract
- Pump Rate
- Pumping Interval
- QC Results
- Sample
- Sample Site Zone
- Sample Tracking
- Screening Criterion
- Screening Value
- Test Water Level
- Toxicity Testing
- Tracer Injection
- Transect
- Validation Update
- Water Well History
- **Well**
- **Well Construction**
- Well Pump

Note: Tables in Bold Type Represent the Most Commonly Used.

Example NEDD

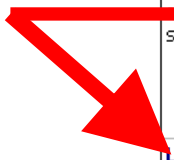


ANALYTICAL_RESULT					
This NEDD specification addresses information associated with the sample results (test method, lab sample ID, qualifiers, etc.). One record should be submitted for each result.					
NEDD FIELD & DESCRIPTION	DATA TYPE	FIELD SIZE	REQ	EXAMPLE	BUSINESS RULE
CONTRACT_ID Unique contract ID assigned by Division Contracting Office: format is UIC (6 characters) + FY (2 characters) + FAR code (1 character) + Number (4 characters).	Text	13	Yes	D459559365800	
DO_CTO_NUMBER Contract Task Order (CTO) or Delivery Order (DO) number assigned by Navy. Format is NNNN. For example, CTO 12 is recorded as 0012.	Text	4	Yes	0012	
PHASE Task Phase, SubTask Number or Annual Quarter.	Text	8	No	QTR1	
INSTALLATION_ID Unique identifier for installation associated with the sample analyzed.	Text	20	Yes	WHIDBEY	INSTALLATION_ID must be selected from the INSTALLTION_ID Naval Master List.
SAMPLE_NAME Unique or alternate sample name assigned by the contractor or derived from historical data submittal.	Text	50	Yes	MW-1-11-02-98	
ANALYTICAL_METHOD Analytical Method ID defined in accompanying domain-lookup table.	Text	20	Yes	6010	
LAB_NAME The name of the laboratory that conducted the analysis.	Text	50	Yes	LAUCKS	LAB_NAME must be selected from the LABORATORY_NAME Naval Master List. If LAB_NAME is new, corresponding LAB NEDD must be submitted.
CONTRACTOR_NAME The name of the contractor or consultant with oversight of sampling.	Text	50	No	CONTRACTOR INC.	CONTRACTOR_NAME must be selected from the CONTRACTOR_NAME Naval Master List. If CONTRACTOR_NAME is new, corresponding CONTRACTOR must be submitted.
LEACHATE_METHOD Data code for the leachate method used on sample.	Text	16	No	SW1310	
SAMPLE BASIS Sample basis of analysis (e.g. wet weight, dry weight etc.).	Text	16	No	DRY	
EXTRACTION_METHOD Data code for the extraction method used on the sample.	Text	16	No	FLTRES	

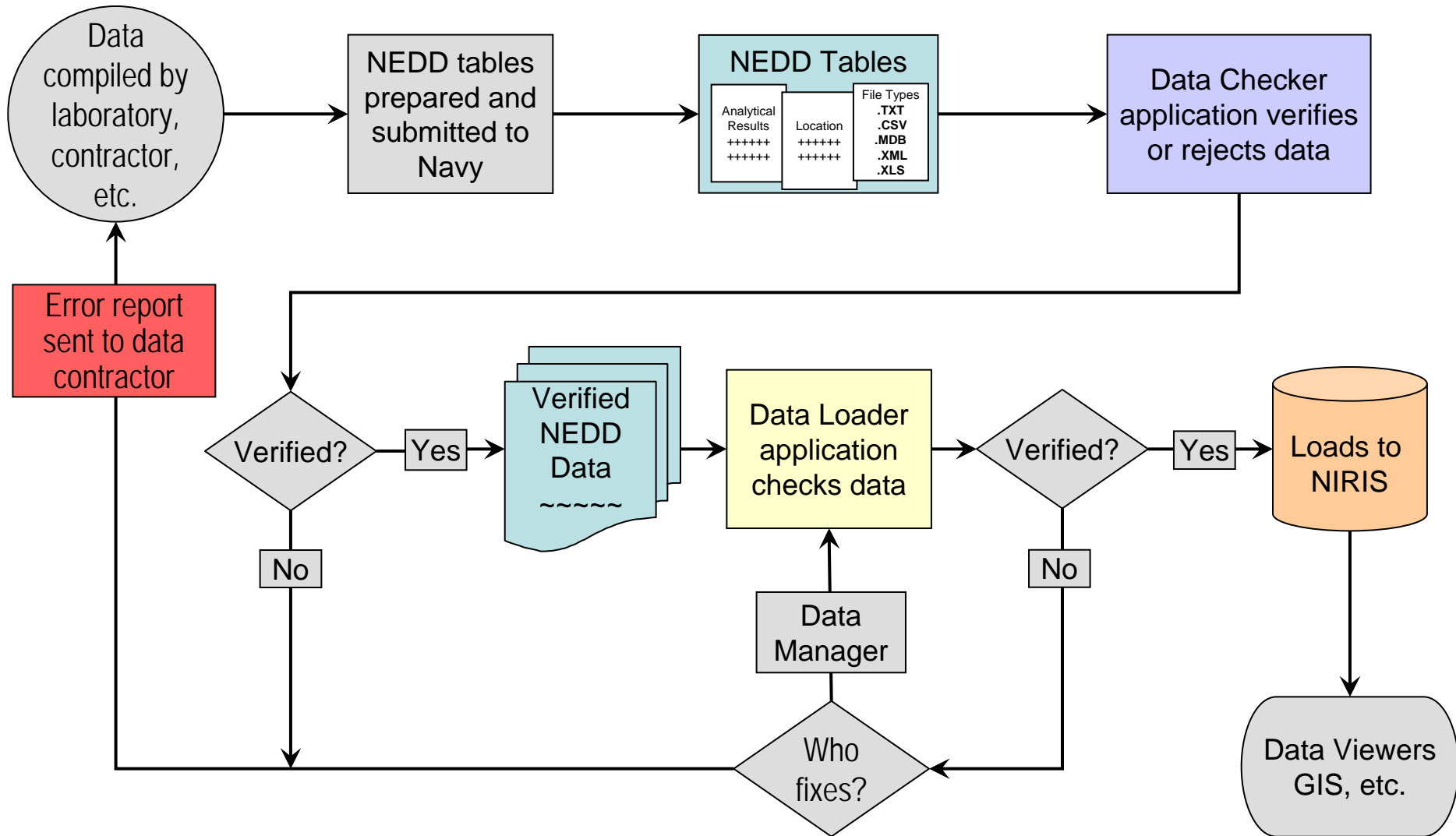


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SAMPLE_NAME Unique or alternate sample name assigned by the contractor or derived from historical data submittal.	Text	50	Yes	MW-1-11-02-98	
ANALYTICAL_METHOD Analytical Method ID defined in accompanying domain-lookup table.	Text	20	Yes	6010	

LAB_NAME	Value	Description
The name of the labor conducted the analysis	D91AVSM	Draft 1991 Determination of acid volatile in sediment leachate
	DISWAT	Leaching of analyte from soil samples using distilled water.
CONTRACTOR_NAME	M1311	Modified toxicity characteristic leaching procedure - water leachate
The name of the contractor	SW1310	Extraction procedure (EP) toxicity test method and structural integrity procedure.
conducting the sampling.	SW1310A	Extraction procedure (EP) toxicity test method
	SW1311	Toxicity characteristic leaching procedure
LEACHATE_METHOD	SW1312	Synthetic Precipitation leaching procedure
Data code for the leach method used on sample	SW924	SW-924 leaching procedure
SAMPLE BASIS	TRN	Transition
Sample basis of analysis: wet weight, dry weight	WET	California Waste Extraction Test (WET)
EXTRACTION METHOD		
Data code for the extraction method used on the sample.		



Overview of NAVFAC Data Flow Process



Agenda



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Visualization Tools - Mapping



- **WebGIS**

- ESRI ArcIMS, preset functionality
- Easy access
- Data is dynamically updated
- Only works over intranet

- **Desktop GIS via Citrix (eGIS)**

- ArcGIS 9.1, all the features you learned with customized tools
- Citrix account required
- May be used online, or data export allows data to be used in desktop GIS
- Not dynamically updated, but RPM can request update

Demo of Web GIS



Naval Air Station North Island - Microsoft Internet Explorer provided by NMCI

Address: https://niris.navfac.navy.mil/niris/maps/viewer2.aspx?map=nasni&instln=NORTH_ISLAND_NAS&style=blue

NAVAL AIR STATION NORTH ISLAND

NAS North Island

Quick Zoom

Zoom to Area

Navigation Tools

- Zoom In
- Zoom Out
- Pan
- Zoom Back
- Zoom to Layer
- Zoom to Extents

Analysis Tools

- Screen Results
- Result Query
- Summary Reports
- X-Section Tool

Query Tools

- Identify
- Measure
- Buffer
- Select Features
- Query
- Clear Map

Map Tools

Layers

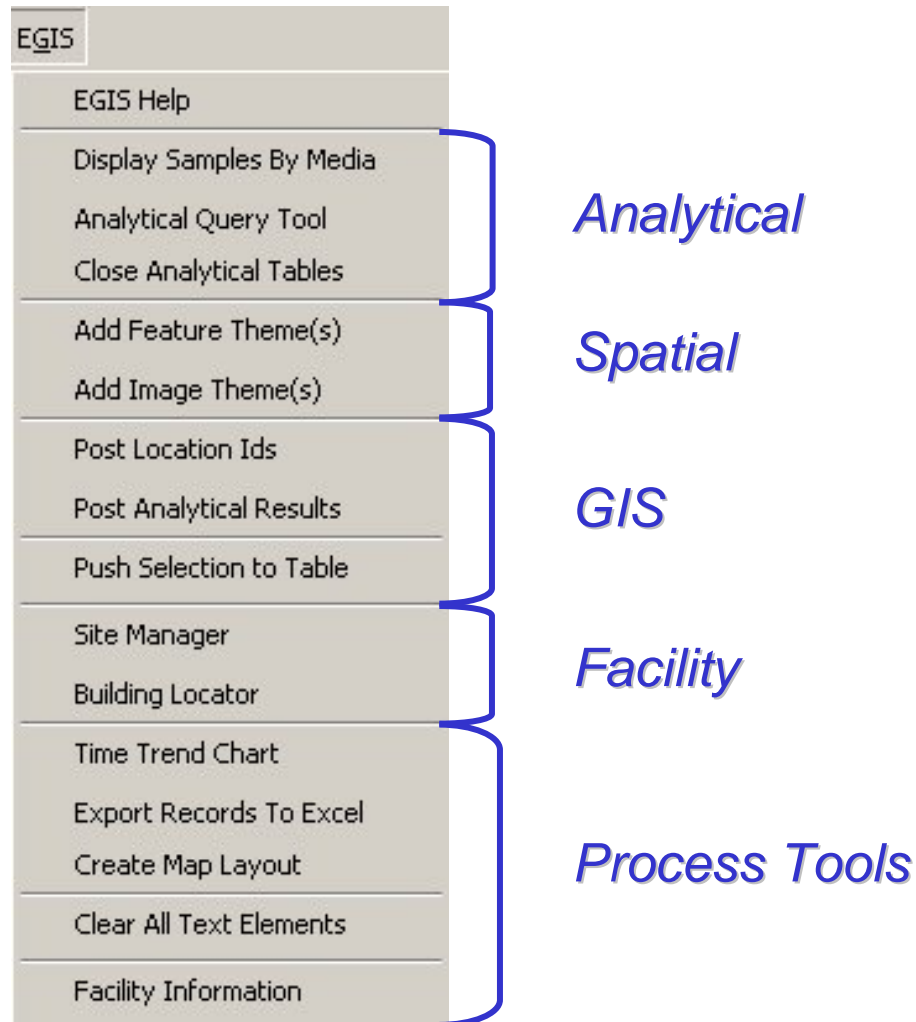
- Sampling Locations
 - Air Soil Gas
 - Borehole
 - Landfill System
 - Open Water
 - Soil Borings
 - Utilities Bldgs
 - Well
 - Misc Locations
- Contours and Plumes
- Base Map
 - Roads
 - Runway
 - Topo
 - Tanks
 - Building Numbers
 - Buildings

Refresh Map

Active Tool: Zoom In

Active Layer: Borehole

EGIS Menu Bar



EGIS Analytical Query Tool



EGIS_IndianHead_NSWC.mxd - ArcMap - ArcInfo

File Edit View Insert Selection Tools Window Help EGIS

Editor Task: Create New Feature Target:

Layers

- Locations: GW
- Locations: SO
- Locations: SD
- Locations: SW
- Locations: ET
- Locations: OTS
- Locations: OTW
- Installation Area
- Environmental Restoration
- Railroad Centerline
- Fence Line
- Gate Line
- Wall Line
- Surface Water Course Cent

Attributes of res_gw

res_gw.OID	res_gw.LOCID	res_gw.SAMPLEID	res_gw.SAMPLECODE	res_gw.CAS	res_gw.PARAMET
0	25MW03	25MW03	N	-20	NITROGEN, TOTAL KJELDAHL
1	25MW03	25MW03	N	-.28	TOTAL ORGANIC CARBON
2	25MW03	25MW03	N	-.561	TOTAL ORGANIC HALIDES
3	25MW03	25MW03	N	100-01-6	4-NITROANILINE
4	25MW03	25MW03	N	100-02-7	4-NITROPHENOL
5	25MW03	25MW03	N	100-41-4	ETHYLBENZENE
6	25MW03	25MW03	N	100-42-5	STYRENE
7	25MW03	25MW03	N	100-51-6	BENZYL ALCOHOL
8	25MW03	25MW03	N	100-75-4	N-NITROSOPIPERDINE
9	25MW03	25MW03	N	10061-01-5	CIS-1,3-DICHLOROPROPENE
10	25MW03	25MW03	N	10061-02-6	TRANS-1,3-DICHLOROPROPENE

EGIS - Analytical Query Tool

Phase

- Design
- Ecological Risk Assessment
- NDW, Indian Head - SSP Investigation
- NDW, Indian Head - SSP Investigation
- NDW, Indian Head - Site Screening Proc
- NSWC Indian Head - CH2MHill Data Tr

Site

- SITE 00012
- SITE 00013
- SITE 00017
- SITE 00021
- SITE 00025
- SITE 00026

Analyte Group

- Inorganics
- Metals
- Ordnance
- Pesticides/Aroclors
- Petroleum HC
- Physical

Analyte

- 1,1,1,2-TETRACHLOROETHANE
- 1,1,1-TRICHLOROETHANE
- 1,1,2,2-TETRACHLOROETHANE
- 1,1,2-TRICHLORO-1,2,2-TRICHLOROETHANE
- 1,1,2-TRICHLOROETHANE
- 1,1-BIPHENYL
- 1,1-DICHLOROETHANE
- 1,1-DICHLOROETHENE
- 1,2,3-TRICHLOROBENZENE
- 1,2,3-TRICHLOROPROPANE
- 1,2,4,5-TETRACHLOROBENZENE
- 1,2,4-TRICHLOROBENZENE
- 1,2,4-TRIMETHYLBENZENE
- 1,2-DIBROMO-3-CHLOROPROPANE
- 1,2-DIBROMOETHANE
- 1,2-DICHLOROBENZENE
- 1,2-DICHLOROETHANE
- 1,2-DICHLOROETHENE, TOTAL
- 1,2-DICHLOROPROPANE
- 1,3,5-TRINITROBENZENE
- 1,3-DICHLOROBENZENE
- 1,3-DICHLOROPROPANE

Location Filter

Location ID:

- 25MW03
- 26MW03
- BGDMW01
- BGDMW02
- BGDMW03
- BGDMW04
- BGDMW05
- IS05MW01
- IS05MW02

Location Type:

- Borehole/Soil boring
- Direct Push/Geoprobe
- Monitoring well
- Temporary well point

Status Active

Sample Filter

Sample ID:

- 25MW03
- 25MW03-F
- 26MW03
- 26MW03-F
- BGDMW001F001
- BGDMW001U001
- BGDMW002F001
- BGDMW002U001
- BGDMW003F001

Sample Matrix:

- Ground water

Eliminate Duplicates

Eliminate Excavated

Criteria Comparison

- FEDMCL Federal MCL for Groundwater
- R3R3CTAP Region 3 RBC for Tap Water

Exceeding ALL selected Exceeding ANY selected

Sample Date

Enter Date in mm/dd/yyyy format

From:

To:

Sample Depth Range

Top Depth:

Bottom Depth:

Concentration Filter

Minimum:

Maximum:

Analyte Filter

- Eliminate Non-Detects
- Show Only Target Analytes
- Show Only Reportable Results

Data Source:

- CH2M Hill
- Tetra Tech NUS, Inc.

Execute

- New Set
- Add to Set
- Select from Set

Query

- Clear Query
- Load Query
- Save Query
- Cancel

Time Trend



EGIS - Time Trend Chart

Generate an Excel time trend chart based on the location and parameter(s) selected below

Select a Location:

- IS17MIP08
- IS17MIP09
- IS17MIP10
- IS17MIP11
- IS17MW01
- IS17MW02**
- IS17MW03
- IS21MW01
- IS21MW02
- IS21MW03
- IS21MW04
- IS25MW01
- IS25MW02
- IS28MM01

Select a Parameter:

- ACENAPHTHYLENE
- ACETONE**
- ACETOPHENONE
- ALUMINUM
- ANTHRACENE
- ANTIMONY
- ARSENIC
- ATRAZINE
- BARLIUM
- BENZALDEHYDE
- BENZENE**
- BENZO(A)ANTHRACENE
- BENZO(A)PYRENE
- BENZO(B)FLUORANTHENE

Eliminate Duplicate Samples

Chart Cancel

Microsoft Excel - TT_Example_1_rev1.xls

IS17MW02

res_gw.OID	res_gw.LOCID	res_gw.SAMPLEID	res_gw.SAMPLECODE	res_gw.CAS	Parameter
5841	IS17MW02	IS17MMA020205	N	108-90-7	CHLOROBENZENE
5858	IS17MW02	IS17MMA020205	N	67-64-1	ACETONE
5860	IS17MW02	IS17MMA020205	N	71-43-2	BENZENE
5901	IS17MW02	IS17MMA02071702	N	108-90-7	CHLOROBENZENE
5917	IS17MW02	IS17MMA02071702	N	67-64-1	ACETONE
5919	IS17MW02	IS17MMA02071702	N	71-43-2	BENZENE
5965	IS17MW02	IS17MMA021000	N	108-90-7	CHLOROBENZENE
6015	IS17MW02	IS17MMA021000	N	67-64-1	ACETONE
6019	IS17MW02	IS17MMA021000	N	71-43-2	BENZENE

Record: 1 | Show: All Selected | Records: (0 out of 31873 Selected) | Options

Chart1 | Data | Sheet1 | Sheet2 | Sheet3

Ready CAPS N.01

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Invested in Interoperability early on:

- **Key ID fields from other enterprise databases**
- **Centralized, Uniform database**
- **Spatial Data Standard compliance**

Interoperability allows:

- **Sharing, leveraging of data**
 - **Asset Management Business Line: Regional Shore Installation Management System (RSIMS)**
 - **NIRIS provides ER data e.g., IR site boundaries, Land Use Controls**
 - **RSIMS provides base boundaries, buildings**
- **Roll up of ER program data**
 - **GeoReadiness Repository**

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Summary



- **NIRIS uses common business practices to manage, access, and view NAVFAC Environmental Restoration (ER) Program information:**
 - ✓ IRP and MRP analytical and spatial data
 - ✓ Documents (including the Administrative Record, Post Decision, and Site Files)
- **Using GIS and web-based applications in a consistent and cost-effective manner**

***N*aval *I*nstallation *R*estoration *I*nformation *S*olution**