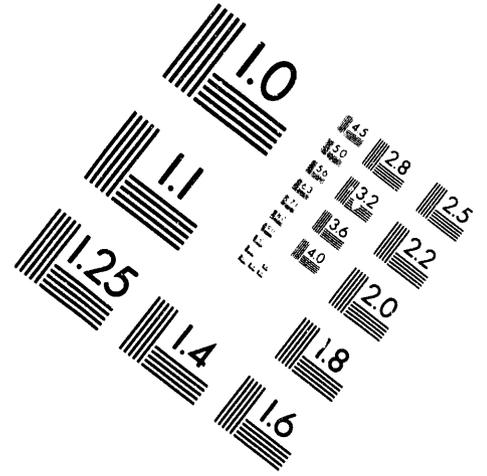
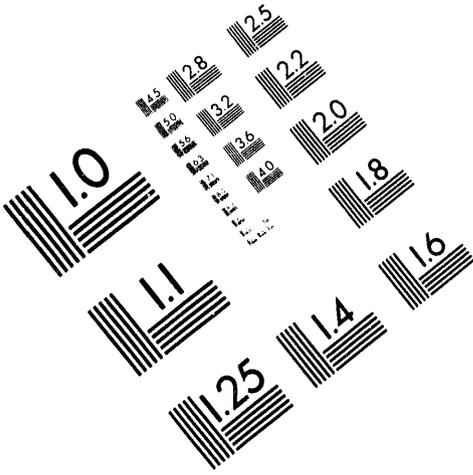




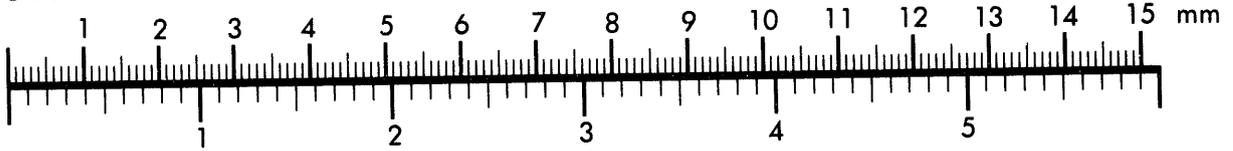
AIM

Association for Information and Image Management

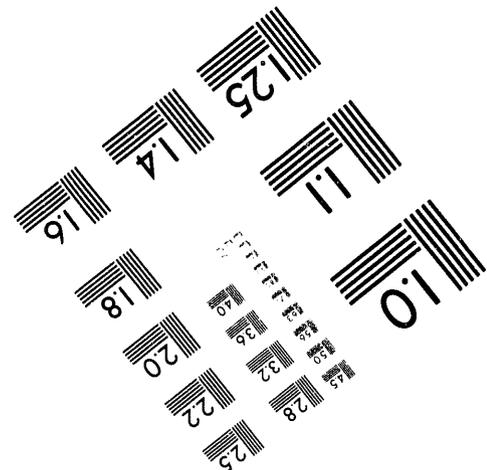
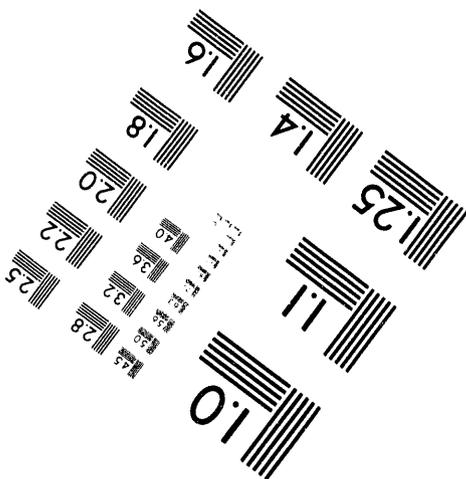
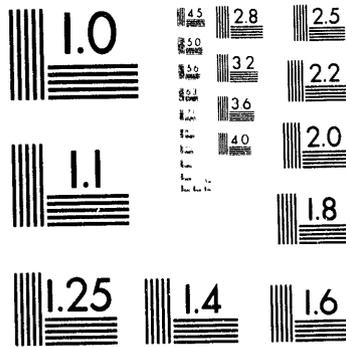
1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910
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DECISION-AIDS FOR ENHANCING INTERGOVERNMENTAL INTERACTIONS: THE PRE-NOTIFICATION ANALYSIS SUPPORT SYSTEM (PASS)

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DECISION-AIDS FOR ENHANCING INTERGOVERNMENTAL INTERACTIONS:
THE PRE-NOTIFICATION ANALYSIS SUPPORT SYSTEM (PASS)

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ABSTRACT

The Department of Energy (DOE) plans to honor its commitment to government-to-government interactions by providing advance notice of DOE spent fuel and high-level waste shipments to Indian tribes whose jurisdictions are crossed by or adjacent to transportation routes. The tribes are important contributors to a regional response network, and providing tribes with advance notice of DOE shipping plans marks the start – not the end – of direct, government-to-government interactions with DOE. The Tribal Prenotification Analysis Support System (PASS) is being developed for the Office of Special Programs within the Department's Office of Environmental Restoration and Waste Management. PASS will help DOE-Headquarters to coordinate field office activities and provide technical and institutional support to the DOE field offices. PASS is designed to be used by anyone with minimum computer literacy and having contemporary computer hardware and software. It uses on-screen maps to choose and display a shipment route, and to display the tribal jurisdictions. With forms that are easy to understand, it provides information about each jurisdiction and points of contact. PASS records all contacts, commitments made, and actions taken.

I. INTRODUCTION

In keeping with the Department of Energy's commitment to interacting with Indian tribes on a government-to-government basis, the Assistant Secretary for Environmental Restoration and Waste Management has committed to provide advance notice of DOE spent fuel and high-level waste shipments to Indian tribes whose jurisdictions are crossed by or adjacent to transportation routes. While the responsibility for providing this advance notice will reside with DOE field offices, DOE-

Headquarters needs to coordinate field office activities and provide technical and institutional support to the DOE field offices, as required.

To that end, the Tribal Prenotification Analysis Support System (PASS) has been developed for the Office of Special Programs within the Department's Office of Environmental Restoration and Waste Management. PASS is designed to:

- identify tribal jurisdictions crossed by or adjacent to DOE's radioactive material transportation corridors;
- provide information about each tribal jurisdiction, including the responsible person to contact regarding radioactive material shipments;
- maintain records of each contact made by DOE personnel, when made, by whom, actions taken and commitments made.

PASS operates on a personal computer, using commercially available Geographic Information System (GIS) and relational database software. An overview of PASS is provided below, followed by a review of data sources and how PASS is operated. Finally, the paper discusses current issues and future directions for developing PASS.

II. OVERVIEW OF PASS

PASS is a dedicated GIS. That is, it is designed to provide a limited number of GIS operations to support tribal prenotification and tracking. The system includes hardware, software, data, and an operator.

A. Hardware

PASS requires the following commercially available hardware:

Relationship Between Geographic and Attribute Data

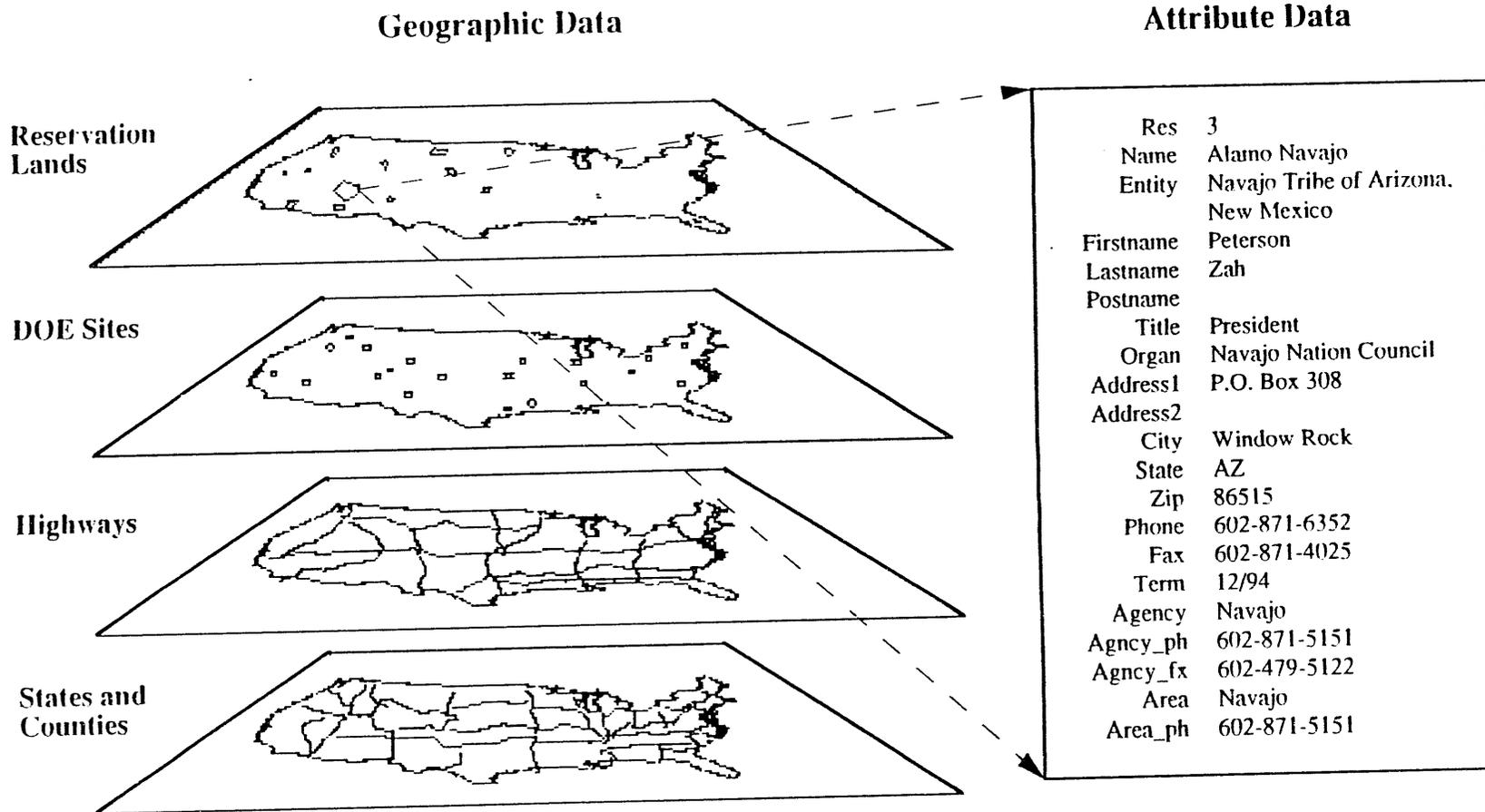


Figure 1. Relationships between data types.

Prenotification Analysis Support System
US Department of Energy
Environmental Restoration & Waste Management

- a PC-compatible microcomputer,
- an 80386 (minimum) or an 80486 (better) central processing unit,
- an 80387 math co-processor,
- 8 Mb of system memory (minimum),
- 200 Mb capacity hard drive (minimum),
- VGA color display monitor,
- graphics printer or pen plotter for map output.

B. Software

PASS uses PC-Arc/Info® (version 3.4Dplus), a commercially available GIS software package. This software can link with a relational database management system (RDBMS) that recognizes files in "DBF" format. The RDBMS used by PASS is FoxPro®. It is used to construct and manipulate the attribute data files that are linked to the geographic files.

C. Operator

PASS is designed to accommodate a variety of potential operators. While much GIS software can be complicated to operate, PASS uses only a limited number of operations, and the interface makes these available through simple, clear menu choices. Thus, any operation may be performed with a minimum number of keystrokes. The operator needs only a general familiarity with personal computers to work with the system.

D. Data

PASS contains two types of information: *geographic data* and *attribute data*. Geographic data provide information about the location and extent of:

- state, county, and tribal jurisdictions,
- locations of DOE facilities,
- highways, railways and barge routes.

Attribute data contain detailed information about state and tribal jurisdictions throughout the US. The GIS maintains explicit links between these two sets of data (Figure 1), so that system knows both where something is and what it is like.

The geographic data are aggregated and stored as separate *coverages*. Each coverage is an independent collection of spatially distributed information that is related to the other coverages by a common geographic coordinate system. Each coverage can be analyzed separately or combined with other coverages. In addition, each feature of each coverage is associated with its own set of attribute data, which are stored in a separate, linked database. The attribute data can be manipulated and queried according to

the relations established in the database. The operations of PASS rely upon and use both geographic and attribute data relationships.

III. DATA SOURCES

The data for PASS have been assembled from a number of different sources. Almost all of the data have been acquired in digital form. A substantial part of the work of constructing PASS has involved converting acquired data into a form usable by PASS, reconciling information from divergent sources, and creating an accurate cross-reference index for Indian tribes and Indian reservations. More than one tribe may be affiliated with a single reservation, and some tribes are affiliated with more than one reservation land area.

A. Geographic Data

The PASS geographic data set consists of basic coverages that can be modified and combined to produce the required analysis. The coverages that are actively used are shown on Figure 2. These data include state and county boundaries, highways, railroad and barge routes, DOE shipping and receiving facilities, and tribal reservation land areas.

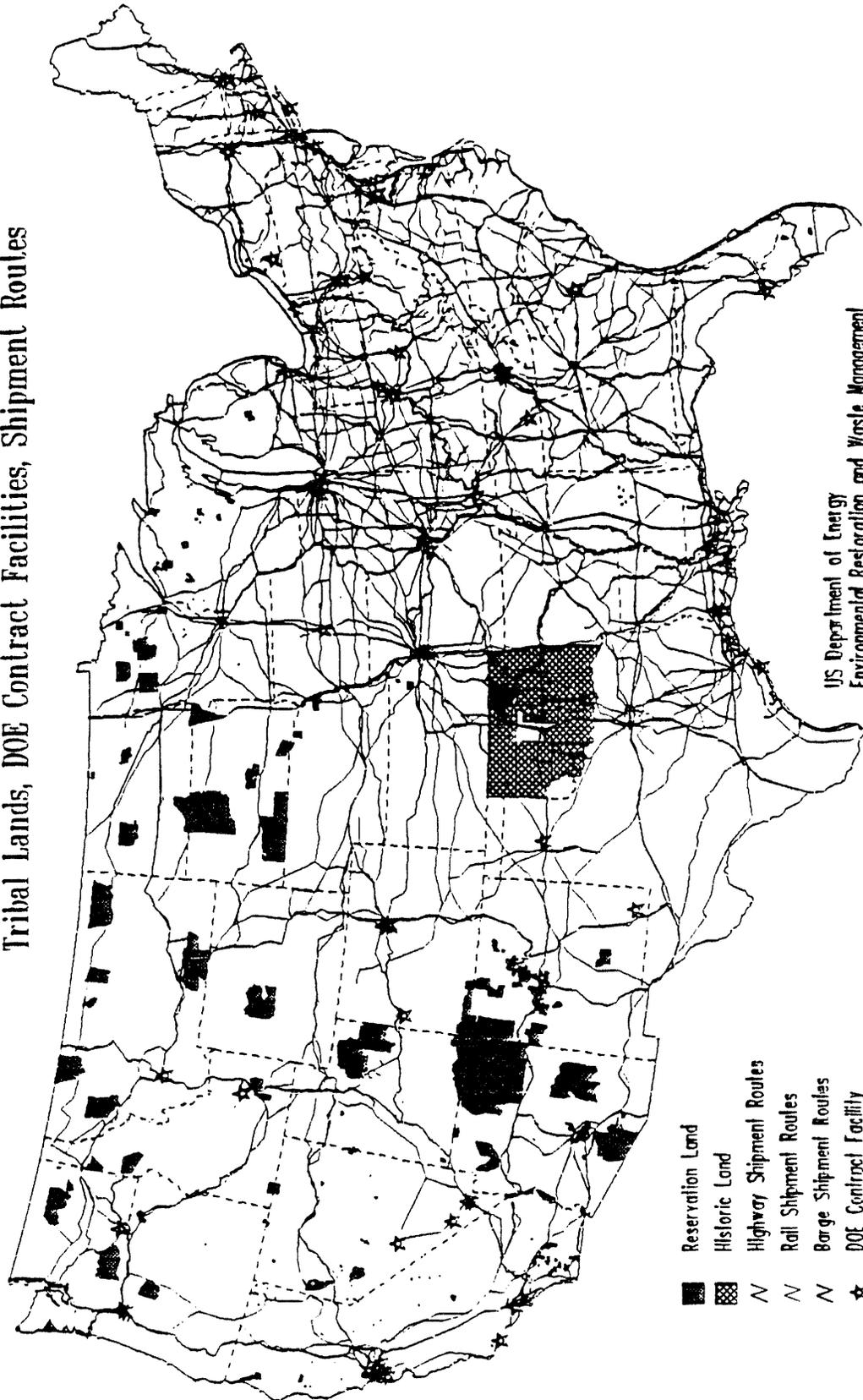
1. State and County Boundaries. COUNTY is a detailed polygon coverage of the counties in the continental US, derived from the US Geological Survey (USGS) 1:2,000,000 scale Digital Line Graphs (DLG).¹⁰ Each polygon is labeled with a Federal Information Processing Standard (FIPS) code and a text name for the county. This file includes all coastal islands. Several processing challenges were encountered with geometry (edge-matching) and coding (the USGS file had some errors). Where sheet edges met, one boundary was selected for the final coverage, based on reference to the Rand McNally printed map.⁸ Attribute coding errors were found through a series of queries and corrected.

STATE is a detailed polygon coverage of the 48 continental states, derived from the COUNTY coverage.

2. Highways. This data set includes all the interstate highways in the conterminous 48 states and most of the federal primary and secondary roadways.

NHPN_MJR is the primary coverage from which the other highway coverages were extracted. It is derived from the National Highway Planning Network data files, and it contains a subset of the highways, based on a code that identifies major links.⁴ Some segments were left out, if they are in parts of the country where they are not very likely to be used in DOE radioactive material shipments, because PC Arc/Info® does not have the capacity to handle

Tribal Lands, DOE Contract Facilities, Shipment Routes



US Department of Energy
Environmental Restoration and Waste Management

November, 1993

Not to Scale

Figure 2.

the entire NHPN system's 49,033 road segments.

ROADNET is derived from **NHPN_MJR**. This coverage includes all interstate highways and the US highway segments that connect the interstate system to DOE transport sites. This is the highway coverage from which the PASS user selects a shipment route.

WIPP_RTE is derived from **NHPN_MJR**. This coverage includes only those roadway segments that are the planned WIPP transportation corridors, based upon information contained in the Final Supplemental EIS for WIPP.⁷

3. Railroad and Barge Routes. These data sets include the mainline and shortline railroads in the conterminous 48 states together with inland waterway and deep water barge routes. The first seven data sets, described below, comprise the Oak Ridge National Laboratory (ORNL) Rail and Barge Database.⁶ The rest of the data sets were derived from these.

NETWORK9.DAT (15,344 records) Each record in this file is a separate link in the combined rail and barge network of the conterminous 48 states. This file includes node (end points of each link) identifier numbers and attribute information for each link. **LATLON.DAT** (17,500 records) contains latitude and longitude coordinates for each node. **OWNERSHP.NT9** (96 records) contains the names of the 96 ORNL subnetworks. **AARTRSN.NT9** (1 record) is a translation table from AAR number to ORNL subnetwork number. It contains a single vector of 999 numbers. **TRANSFERS.NT9** (2,976 records) contains transfer locations between all railroads. **NODE.NAM** (10,731 records) contains the names of all nodes that are part of the rail network. **BARGECHN.DAT** (593 chains, variable length records) contains barge links that include additional "shape points" to enhance the detail of the barge routes.

RAILBARG is the primary coverage containing the combined railroad and barge routes. It is derived from **NETWORK9.DAT**, **LATLON.DAT**, **OWNERSHP.NT9** and **AARTRSN.NT9**.⁶ It contains the geographic data for each link in the network as well as a network type identifier, number of tracks, type of signal system, owner of the link, and any ORNL subnetwork numbers.

RAIL is derived from **RAILBARG**. This coverage includes all railroads designated as mainline railroads together with any branchline segments that connect the mainline system to DOE transport sites. This is the railroad coverage from which the PASS operator will select railroad segments of a shipment route.

BARGE is derived from **BARGECHN.DAT**.⁶ This is the barge route coverage from which the PASS operator will select barge segments of a shipment route.

4. DOE Shipping/Receiving Facilities.

DOE_SITE contains the locations of DOE facilities that may ship or receive radioactive materials and which are included in DOE Orders requiring advance notification of planned shipments. The approximate locations for these facilities were identified in the DOE locator maps and located on the US map.^{9, 8} Facility locations were assigned coded identifiers and then digitized from this map.

Additional facilities (e.g., nuclear power plant sites, university-based research reactors, low-level waste repositories) may be added to later versions of PASS.

5. Tribal Reservation Land Areas. **IND_LAND** represents the boundaries of federally-recognized Indian reservations in the conterminous 48 states. It is derived from two coverages provided by the Bureau of Indian Affairs (RES1 and RES2), with additional reservations digitized from the 1:5,000,000 scale *Indian Land Areas* map.¹ Several reservations considered critical to the WIPP transportation corridors were missing from the BIA coverages, and these were digitized using the map as a reference.¹ Those reservations represented as points in the BIA coverages were digitized as arbitrarily sized 1 km squares to maintain the polygonal nature of the coverage.

This coverage does not include the boundaries or locations of several categories of lands that are generally associated with tribal lands:⁵

- *ceded* lands (lands ceded to the US government to which some tribes retain treaty-protected rights);
- *possessory and usage* areas that were established, in some cases, in the course of US Land Claims Commission hearings;
- *rancherías* in California, and *state-recognized tribal holdings* in Michigan, New York, Virginia, and Wisconsin;
- *in-holdings* within the tribal reservation boundaries. Such *in-holdings* are lands not held in trust for tribes. These may include fee lands owned by non-Indians, or public domain lands withdrawn from their former trust status (e.g., for National Park Service management or interstate highway rights-of-way).

B. Attribute Data

In addition to boundary information used to produce maps showing DOE facilities, transportation routes, and the jurisdictions that these routes cross, PASS also contains several database files that will enable the Office of Special Programs to follow interactions with tribal representatives. Taken together, these files assist the user in identifying and contacting the responsible person for any tribal governing body (tribal council, etc.). They provide:

- the tribe's name;

- the name of the reservation where the tribe is located;
- the interstate highways, railroads and barge routes that cross the tribe's jurisdiction;
- the Bureau of Indian Affairs (regional) Area Office jurisdiction within which the tribe is located;
- the name, address, phone number and fax number of the responsible person.

The PASS database files include the following:

ENTITY (806 records) contains all federally recognized tribal entities as they appear in the 1993 *Federal Register*.³ Each record includes an entity code, a name, and a true/false code for whether the entity is located in Alaska. The PASS database is not concerned with Alaska-based entities, so this code allows the system to sort out the nearly 300 federally-recognized tribal entities in Alaska.

LEADER (546 records) contains the names of tribal leaders for all federally-recognized tribal entities (including Alaska). This information comes from the Bureau of Indian Affairs *Tribal Leaders Directory*, which is updated annually in July.² The file includes each leader's name, address, phone number, tribal entity, and a code for the name of the Bureau of Indian Affairs agency (the lowest level, local administrative unit that, in some but not all cases, is the administrator for a single reservation).

RES (223 records) contains a list of all reservations (code and name) contained in the IND_LAND geographic coverage. Some reservations, particularly in the Southwest (e.g., Navajo and Cocopah), consist of several separate land areas under the same tribal government jurisdiction. A single record is used to represent each of these multi-parcel reservations.

AGENCY (88 records) contains information on each of the Bureau of Indian Affairs field agency offices, as described in the *Tribal Leaders Directory*.² As mentioned above, in some cases, a single agency is administrator for several reservations (e.g., the Northern Idaho agency administers the Kalispel, Coeur D'Alene, and Spokane reservations). The database file includes an agency code, and agency name, a code for the BIA Area Office jurisdiction, the name of the agent, telephone numbers (commercial and FTS), and a fax number for the agency office.

AREA (12 records) contains information on the 12 regional Area Offices of the Bureau of Indian Affairs. For each Area Office, the record includes a code number, a name, an address, a telephone number, and a fax number.

ENT_LDR (787 records) is a many-to-many link file that connects legal entity codes (from the ENTITY file) with leader codes (from the LEADER file). This file enables the system to cross-reference federally-recognized tribes with their leaders when the user knows either one or the other. This allows one to answer such questions as, "Who is the leader of the Mississippi Choctaw Tribe?" or

"Of what tribe is Chief Phillip Martin the leader?"

ENT_RES (216 records) is a many-to-many link file connecting legal entity codes (from the ENTITY file) with reservation codes (from the RES file). This file is necessary because some reservations contain more than one federally-recognized tribe, each with its own leadership and governing body. If a user asks PASS, "Who needs to be notified on the Wind River (Wyoming) Reservation?" this file enables the system to correctly identify both the Cheyenne-Arapaho and Shoshone tribal governing bodies for that reservation.

PAT_LINK (225 records) links the reservation codes in the IND_LAND geographic coverage to available data on leaders, entities, and BIA agency offices. Due to software limitations, some cases may be dropped if information is missing. This file is not maintained directly, as are the other database files. It is created using a database query, and it is the data file from which the final information for any route is extracted.

IV. OPERATING PASS

PASS is designed to be run by even a novice user. To effectively use the capabilities of PASS, the user should be generally familiar with the operation of personal computers. However, one does not need to be expert in the use of PC's and does not need to be familiar with the operation of geographic information systems. All PASS functions are accessed through simple, plainly worded menus or clearly defined function keys. Nearly all jargon and the specialized language of GIS has been eliminated from PASS. This renders it accessible to the greatest range of users.

A. Sequence of PASS Operations

The analysis and reporting functions of PASS are divided into several distinct sets of operations. These operations may be performed consecutively in one session, or the progression of operations may be interrupted and started again in any manner that suits the user. The general order of operations is:

- 1) The user starts by typing "PASS" at the DOS prompt and pressing <RETURN>.
- 2) The user selects segments of a shipment route from one or more of the comprehensive route networks (ROADNET, RAILNET, BARGNET);
- 3) The selected segments are combined into a complete shipment route;
- 4) The selected route is processed to generate three database files: CROSS.DBF; NEAR.DBF; FAR.DBF. These identify the tribal lands that are, respectively, crossed by the route, within 10km of the route and within 30km of the route.

- 5) A summary report is generated of the tribal lands in each proximity category together with the relevant route identifiers.
- 6) A detailed report is generated that includes the information of the summary report plus the name of each leader to be contacted, and current contact address, phone and fax numbers.
- 7) Not yet implemented, a contact database of all crossed and proximate reservation lands will be generated. This will allow the user to record contacts made, actions taken and commitments made with respect to each tribal jurisdiction in the vicinity of a particular shipment route.

The first six operations have been implemented and tested for the highway network. The rail and barge networks are currently being implemented and the operations are being modified to include this additional data. Finally, the contact database will be implemented in FoxPro®, allowing the user to select any jurisdiction and log all related activities.

B. PASS Menus and Function Keys

The system is started by typing "PASS" at the DOS prompt and pressing <RETURN>. The program begins and displays the Main Menu. For all menus, the user indicates a choice by pressing the appropriate letter. The choices of the Main Menu are:

- Start a NEW route.
- ADD segments to the existing route.
- PROCESS the route now.
- EXIT to DOS.

"EXIT to DOS" terminates the PASS program, closes all files, and returns the computer to its original configuration.

If the user chooses to start a new route or add segments to the existing route, then the program displays the Route Selection Menu with the following choices:

- Add ROAD segments to the route.
- Add RAIL segments to the route.
- Add BARGE segments to the route.
- Return to Main Menu.

When the user has selected route segments and put them into the ROUTE coverage, then the program returns to the Main Menu for selecting more segments or for processing the route. When the user chooses to process the selected route, then all the subsequent work of processing of the route is done automatically by the PASS program. A comprehensive report and a summary report of tribal lands crossed by or near to the selected route are written to

text files. In addition, a number of intermediate files are retained for further use:

- the coverage **RLAND** contains all segments of the route that actually cross tribal lands;
- the coverage **ZLAND** contains all segments of the route that are within 30 km of any tribal land, and these segments contain identifiers that describe their proximity;
- the database files **CROSS**, **NEAR** and **FAR** contain records for each tribal jurisdiction that is, respectively, crossed by, within 10 km of or within 30 km of the shipment route. These last three files are the files from which the reports are constructed.

C. Selecting Route Segments

The operator selects a route from one or more of the route networks (ROADNET, RAILNET, BARGNET). Access to each of these networks and the selection functions of PASS is gained through the Route Selection Menu, described above. When one of the networks is chosen from the menu, PASS automatically begins an edit session, selects the chosen coverage, and draws the coverage to the screen for the operator to begin the selection process.

All operations for the selection of a route may be done with no operating knowledge of Arc/Info® or Arcedit. Each operation is performed by using the mouse to point to items on the terminal screen and pressing a function key to initiate the operation.

D. Output

Any of the various geographic coverages, including a selected route, may be drawn to the user's terminal screen or printed as maps, using appropriate Arc/Info® commands. We recommend using a graphics printer or a pen plotter to make maps. PASS automatically displays the route networks together with the chosen route, during the route selection phase of operation. In the future, PASS will include functions for automatically printing maps on the user's printer.

As part of its analysis functions, PASS automatically produces the two text file reports, described above. These are generic ASCII text files. They may be printed directly with the PRINT command or with any word processing program.

V. CURRENT ISSUES AND FUTURE DIRECTIONS FOR PASS DEVELOPMENT

A. Characterization of In-Holdings and Ceded Lands

The BIA source file from which reservation boundary

data were compiled does not consistently reflect in-holdings (i.e., non-trust lands within reservation boundaries). We recommend that more detailed descriptions of some tribal jurisdictions be developed, specifically those where a potential route crosses or is adjacent to tribal land areas. Not all tribal lands are in such close proximity to potential routes, so not all need to be described in such fine detail. The source file also does not identify ceded lands that may be crossed by relevant DOE shipments. Identification of such lands should also be made in the process of route evaluation and shipment planning.

B. Additional Data

The inclusion of additional data relevant to DOE's interactions with tribes will increase the long term usefulness of PASS. Such data may include:

- a description of the emergency preparedness capabilities of jurisdictions along DOE transportation corridors;
- the amount of financial or technical assistance that corridor jurisdictions have received through grants, cooperative agreements, or contracts;
- the status of emergency preparedness training for tribal, state, and local public safety authorities;
- the presence of mutual assistance agreements between corridor jurisdictions in the region; and
- tracking of previous commitments made to tribes.

Other information that might eventually be built into the system includes road condition data, localized weather conditions not reported via TRANSCOM, and accident records.

C. Government-To-Government Interactions

The current development of PASS is based on two assumptions about corridor tribes: (1) the tribes are important contributors to a regional response network, and (2) providing them with advance notice of DOE shipping plans marks the start – not the end – of direct, government-to-government interactions with DOE. In many cases, these interactions can result in substantial benefit to DOE's safe, efficient transportation of radiological materials while also enhancing corridor tribes' emergency preparedness capabilities through carefully targeted technical and financial assistance. PASS is seen as an information tool to support DOE in honoring its commitment to productive government-to-government interactions.

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Arc/Info® is a registered trademark of Environmental Systems Research Institute, Inc. FoxPro® is a registered trademark of Microsoft Corp.

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