NAVAJO NATION
Division of Natural Resources

Navajo Abandoned Mine Lands
Reclamation/UMTRA Department

“Restoring Navajo Lands to Enhance Beauty,
Harmony and Quality of Life”

Melvin H. Yazzie
Senior Reclamation Specialist
Navajo Abandoned Mine Land Reclamation/UMTRA

- Abandoned Mine Lands reclamation projects
- Public Facilities Projects
- Navajo UMTRA Program
- Partnerships/Future
DIVISION of NATURAL RESOURCES
Fredrick White, Executive Director

- Abandoned Mine Land Reclamation/UMTRA
- Agriculture Department
- Archaeology Department
- Department of Water Resources
- Fish & Wildlife Department
- Forestry Department
- Historic Preservation Department
- Minerals Department
- Navajo Land Department
- Parks & Recreation Department
- Resources Enforcement Department
Public Law 95-87

Surface Mining Control and Reclamation Act (SMCRA) of 1977

U.S. Department of Interior

*Amendments: most recent in 2006
SMCRA

• The main objective of SMCRA is for States/Indian tribes to establish their own regulatory programs (Title V) to monitor both surface and underground coal mining and reclamation operations.

• Section 405 of SMCRA was amended on July 11, 1987 to allow the Navajo, Hopi, and Crow Indian tribes to have an approved Title IV AML program without having an approved Title V regulatory program.

• Navajo Nation Inventory on Non-coal mines. OSM – Coal.
National Association of Abandoned Mine Lands Reclamation Programs (NAAMLRP)
In 1977, Congress passed the Surface Mining Control and Reclamation Act (SMCRA) of 1977, Public Law 95-87 to help regulate the Coal Industry and set up an Abandoned Mine Lands (AML) reclamation fund.

Lands and waters eligible for reclamation under this authority are Tribal Trust Lands which were mined or affected by mining and abandoned or left in an inadequate reclamation status prior to August 3, 1977 and for which there is no continuing reclamation responsibilities under Federal, State and Tribal laws.
Information Collected (Inventory)

- Locations
- Mine Features and dimensions
- Extreme Dangers – reports
- Site Visitation
- Accessibility
- Attraction
- Public Concern
- Environmental Setting
- Preferred Alternatives

SMCRA – emphasis on Physical Dangers to the Public. Abandoned Mine Lands (AML) are prioritized.
Mining - Surface / Underground?
(Engineering and Geology)

- Mining methods, stability, engineering, accessibility, dangers, properties, reclamation techniques and cost.

Surface Mine Features - Open Pit (PI1), Rimstrip (BE), trench (BE)

Underground Mine - Portal (P), Vertical Shaft (VO2), and Incline Shaft (VO1)

Excess Mine Waste (DPE)

Sandstone
Clay/Mud

Minerals/Coal

Clay/Silt
Photos: Coal, Uranium, Copper, and S&G
Example of AML Problems – Surface and Underground.
High Priority Mining Problems:

Open pit w/standing Water. Uranium mines -used for livestock & swimming

Open pit used for Illegal trash dumping
Mining Problems:

Mine waste that blends in with the natural topography.
Dangerous openings:

Lures public to enter to explore, exposes them to radiation and unsafe conditions.
Uranium mines used
For livestock containment

Radiation exposure of livestock associated with illness of past Miners, from the food chain effects.
Mining Problems:

Unknown underground workings, dangers to recreational purposes.
Mining Problems:

Underground workings prone to subsidences and unstable.
Abandoned Mine Waste

(Coal)

Contaminates drainages, can become coal fires, aesthetic problems.
Abandoned Mine Waste

(Non-Coal)
Low Priority:

Small rimstrip (dozer cut) and prospect (small opening).
Public Relations:

Common Questions:
- What kind of Public Relations is required?
- How do you address Uranium Mines?
- Are there any special considerations?
- Comprehensive Public Relations effort involves:
  - Our Staff
  - Land Users
  - Community/Public
  - Chapter Officials
  - Other interested parties
Health Physics:

- Employee Protection
- What are we protecting ourselves from?
- Personnel and Training?
- What kind of field equipment is required?
- Field Applications?
MONITORING PERSONNEL EXPOSURE

- **Dosimetry device** are worn by personnel to monitor and document dose received from external radiation source. Most commonly used is the thermo luminescent dosimeter (tld) badge. The device shall be properly stored in a controlled area when not in use for quality assurance and control purpose.

- **Bioassay sampling** is required from all personnel to assist in monitoring for internal exposure. One initial and one exit sample will be required from all workers. Random quarterly samples will be collected from individuals that have the highest potential exposure.
THERMOLUMINESCENT DOSIMETER BADGE (TLD)

- **TLD badges** shall be worn on the front part of the body between the shoulders and waist at all time. The badge is used to determine the total dose of radiation received over an extended period of time and is capable of measuring beta and gamma radiation. All badges are collected and processed by qualified vendor.

- TLD badges should only be worn on the job site.
- TLD badges should not be taken apart by personnel.
- TLD badges lost by personnel shall notify Health Physicist personnel
- TLD badges lost by personnel shall reimburse the vendor.
Health Physics and Radiological Equipment

- Health Physics Monitoring and Construction Plan
- Health Physics Training for all field crew
- In-house guidelines for radiometric levels
- Staff knowledgeable through training and background with
- Maps for technical designs

- Construction Monitoring of Equipment and Personnel
- Training to in-house personnel and other entities
- History of Uranium mining - very important aspect of our Program
In-house uranium radiometric concepts:

- **Class A material** - geologic material that is near natural background levels.

- **Class B material** - geologic material that exhibits radiometric levels above natural background, but below 25 pCi/gm of surface contamination or 50 uR/hr of true exposure at 1-meter.

- **Class C material** - geologic material that has radiometric levels above 25 pCi/gm of surface contamination and 50 uR/hr of true exposure levels, emphasis placed on backfilling this material first.
CONTAMINATION CONTROL AND AREA RESTRICTIONS

- Contamination is radioactive material in an undesired location.
- It must be controlled to prevent inhalation or ingestion and to prevent spread to uncontaminated areas.
- Contamination is monitored by swiping, direct frisking, and by sampling air for airborne particulates.
- Access control point is the ONLY entrance and exit for all personnel and equipment of contaminated areas.
- Construction personnel entering will be required to wear Personal Protective Equipment (PPE) depending on the form and concentration levels of contamination.
Reclamation Techniques

Surface and Underground Mines
Reclamation Flow Chart

AML Site: Inventory or New

*Field Evaluation - Value Engineer

**Prioritization

Engineering Designs

National Environmental Policy Act Requirements

Contract Documents/ Technical Spec.

Construction

Close-outs

Start to Finish: up to 2 years
Radiological Data/Map
Benefits: Dangerous underground mines are closed
Polyurethane Foam
Polyurethane Foam Closure
Exterior Rock Matrix
Benefits: Wildlife habitat is restored
Portal Bat-gate
Polyurethane Foam Transport
Work or Pleasure?
Benefits: Produced Quality Navajo Nation Workforce
Benefits: Contributes to local economy thru Contracting out projects.
Benefits: Land is restored
Reclamation Techniques:

- Engineering Alternatives and cost estimates
- Radiation surveys, pre & post reclamation
- Backfill portals, pits, with waste, and cover with clean material
- Use PUF for cost effectiveness, where applicable
- Redirect drainages, Revegetation, contours
- Monitor for erosion or subsidences
- All the work is contracted out
Summary

- The objectives of SMCRA have been fulfilled in respect to protecting the general public, livestock, wildlife and the environment.
- Land has been restored to a more natural setting.
- The dangerous features associated with past mining have been eliminated.
- Land is more beneficial for livestock, wildlife, and recreational purposes
- Work generated from the AML projects have been going back to the Navajo Nation economy, Navajo Contractors and Navajo work-force.
Coal Reclamation Projects

- Total of 44 Coal Projects initiated.
- 260 Coal sites reclaimed.
- Total cost approximately $3 million.

Non-Coal Projects (Uranium, Copper)

- Total of 1,085 non-coal AML sites inventoried
- 273 non-coal reclamation projects initiated
- Overall: 944 AML sites have been reclaimed as of March 2004; 90% of the total inventoried AML sites.
- Cost for 944 AML sites at approximately 23 million dollars.

*Continue to evaluate, for eligibility, any new AML sites that are reported.
Navajo Abandoned Mine Land Reclamation/UMTRA

- Abandoned Mine Lands reclamation projects
- Public Facilities Projects
- Navajo UMTRA Program
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What Next?

- Staff Experience
- Partnerships
NAMLRP Staff and Expertise

- In-house Expertise with the following Staff: Engineers, Technicians, Computer Scientist, Health Physicist, Business Administration, Accountants, Secretaries, Public Relations, etc.
  - Engineering
  - Health Physics
    - In-house Monitoring Plan, Reclamation Guidelines
  - Environmental
    - NEPA compliance, Environmental Assessments, Army Corp and U.S. EPA compliance, etc.
  - Contract Compliance and Procurement
  - Contracting Requirements
    - Archaeological
    - Biological
Our Public Relations

- Public relations/ community outreach program activities have been very successful:

- Partnerships have developed with other AML programs, OSMRE, USEPA, Army Corps of Engineers, and Navajo Nation entities

- Technical Information Exchange has taken place

- Incorporated the Navajo Culture in with modern day technology

- One of the leading National Programs in AML work, Five (5) National AML awards were bestowed to Navajo AML for “Exemplary Reclamation” and “Prestigious National AML Awards”.
Public Relations
Future:

- Implement the changes from the reauthorization of SMCRA which was recently passed.
- Continue work on AML sites, Coal, Non-Coal and Eastern Agency. This will include new and maintenance work.
- Provide technical assistance related to AML/PFP activities and participation on AML issues.
- Continue work on the Navajo GIS database to include Coal and PFP project locations and information.
- Provide NAMLRP information to other Navajo Nation Departments, governments and chapters.
- Continue with Public Relations, Partnerships and provide technical assistance to others, if available.
What is the Purpose of Partnership(s)?

- What do you want to accomplish?
  - You must have an end in mind, deliverable, timeframes.
  - You must think in terms of a win/win situation.
  - Timely completion of projects with limited resources.
  - Address common issues with innovative solutions.

- How will it be beneficial to all parties?
  - Both parties or more, who will be the lead agency?
  - What do you bring to the table – expertise, etc.

- Are you flexible?

- What kind of agreement is required?
  - MOA’s, MOU’s, AA’s, Inter-departmental, etc.
Who will be involved?

- Who are some potential partners?
  - Colleagues, associates, stakeholders, universities, corporations, local, tribal, state and/or federal agencies.

- Need to create some accountabilities and responsibilities.

- Develop a communication Plan with points of contact.

- Identify the expertise available.

- Think outside the box for assistance.

- Develop a scope of work for all to review.

- Schedule regular update meetings.
Why do you need Partnerships?

- Utilize others expertise
- Joint funding sources
- Resources and equipment
- Lack of personnel
- Time efficiency and cost effective
- Record requirements or audits, good book-keeping
- Regulatory requirements
  - Environmental policies
  - Oversight or inspections
Documentation

Abandoned Mine Lands Inventory System (AMLIS)

and

Geographic Information System (GIS)
The Abandoned Mine Land Inventory System is a computer system used to store, manage and report on the Office of Surface Mining's Inventory of Abandoned Mine Land Problems. This includes both problems in need of reclamation and those that have been reclaimed.

[View map]

AMLIS Data Dictionary

Last Updated: 02/12/2004 14:38:50
Tom Browne, Pagemaster

AML home page   Home Page
Navajo AML Reclamation Program

History related to the GIS Database

- Under WRDA 99, Section 560
  - “TECHNOLOGY DATABASE FOR RECLAMATION OF ABANDONED MINES – The Secretary may provide assistance to non-Federal and nonprofit entities to develop, manage, and maintain a database of conventional and innovative, cost-effective technologies for reclamation of abandoned and inactive noncoal mine sites. Such assistance shall be provided through the Rehabilitation of Abandoned Mine Sites Program managed by the Sacramento District Office of the Corps of Engineers.”

- NAMLRP looked into options for the matching funds, but was unsuccessful.

- In December 2001, NAMLRP agreed to pursue the option of developing a GIS Database for NAMLRP mine sites with the assistance of the ACE.
Inventory/Value Engineering Assessments

- Specific Mine Feature, Dimensions, site dangers/conditions
- Photographs
- Site locations, maps, Global Positioning Systems
- Surface and apparent underground hydrologic conditions
- Level of radioactivity, volume of mine waste, accessibility
- Area of impacts, estimated acreages
- Access conditions and routes
- Location of residences
- Level and type of visitations
- Geology, vegetation
- Proposed reclamation alternatives, type of equipment
- BEST AVAILABLE TECHNOLOGY
Individual Mine Site Id

- Latitude, Longitude, Elevation
- Mine Feature and Size
- Mine Type
- Problem Area Location
- Estimated Mine Waste
- Radiometric Data
- Reclamation Status
- Accessibility
- Visitation
- Nearest Residences
- Quad Names
- Chapter affiliation
- Priority Status
- Impacted Area
- Photographs

Oilcliff # H2 P/C Act
Entrance - 3½' H x 4'W x Depth Unknown
Highwall - 25' and unstable
Drainage occur into portal and retained
Visitation - livestock and wildlife
Accessibility - rough by vehicle, easy by foot
Wash located ~45' south of entrance
Impacted Area - 600'L x 75'W = 0.52 Acre
Drainage pattern from entrance to wash
45'L x 3'W x 1' H
Portal is partially backfilled w/ sediments
Spoil Volume - 115ix 25'W x 10'4" = 1075 yd³
Spoil Volume located ~100 SE of portal

Radiometric Readings:
@ Entrance: 1m - 40, C - 42, S - 28
@ Spoil Bench:
- 1 meter: 28, 32, 24, 115, 40, 85, 70, 150, 200...
- Conteb: 30, 32, 24, 115, 70, 90, 105, 240, 280, ...
- Shield: 28, 32, 140, 35, 70, 70, 120, 120, ...

- 120, 150, 135, 130, 170, 240, 280 = 117.6
- 130, 245, 150, 105, 280, 240, 265 = 176.7
- 60, 130, 70, 60, 125, 150, 140 = 83.6

HIGH = 230.0
Ave = 112.0
LOW = 66.0
Project Area Id (Similar to AMLIS)

- Latitude, Longitude, Elevation
- Project Acreage
- Description of the Project
  - Keywords, # of sites reclaimed, Reclamation Techniques, Cost, year reclaimed, Project Estimates, information from the Close-out reports.
- Contractor
- Radiometric information
- Chapter and Agency Location
- Land Users
- 7.5’ topo quad names
- Photographs
- Others
  - Archaeological, Biological, Paleontological, etc.
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Universal Transverse Mercator (UTM), Zone 12, NAD83
Consultation, Assistance, and Coordination

- Technical Assistance to the Public
- Presentations to education groups. Schools, teachers, etc.
Conferences and Presentations
Abandoned Uranium Mines (AUM) Initiatives

- Further Assessment on Uranium mines throughout the Navajo Nation
- Partners: Navajo EPA, US EPA, NAMLRP and US ACE.
- How can we maximize the current regulatory authorities: SMCRA, CERCLA, Brownfields and RAMS.
- Others? Who else can assist or who else is responsible?
AML Reclamation/future

- Long-term stewardship
- Pilot Projects
- New Technology
- Partnerships/Funding
Mother Nature/Stability
Lesson’s Learned:
Research, Partnerships, Capacity Building, Funding, Communication – message.
DNR Executive Director:
Mr. Fredrick White

NAMLRP Dept. Manager:
Ms. Madeline Roanhorse

Navajo AML Staff