

IMCC / MSHA / OSM Benchmarking Workshop on Underground Mine Mapping

DAY ONE -- October 15, 2003

8:00 a.m. -- Welcome and Introductions

Larry Checca, Mine Safety and Health Administration
John Craynon, Office of Surface Mining

8:15 a.m. -- Purpose of the Workshop / Logistics

Greg Conrad, Interstate Mining Compact Commission

8:30 a.m. -- Federal Agency Presentations

Moderator: *Sarah Donnelly*, Office of Surface Mining

Mine Safety and Health Administration:

Kelvin Wu, Chief, Mine Waste Division

Office of Surface Mining:

John Craynon, Chief, Division of Technical Support
Greig Robertson, Program Specialist
Len Meier, Physical Scientist

U.S. Geological Survey:

Brenda Pierce, Energy Program Coordinator

Bureau of Land Management:

Brenda Aird, Group Manager

10:15 a.m. -- BREAK

10:30 a.m. -- State Presentations

Moderator: *Greg Conrad*, Interstate Mining Compact Commission

Pennsylvania Department of Environmental Protection:

William Bookshar, Engineering Supervisor, Bureau of Deep Mine Safety

Virginia Department of Mines, Minerals and Energy:

Benny Wampler, Deputy Director and
Daniel Kestner, Information Technology Specialist

Noon -- LUNCH (On Your Own)

1:30 p.m. -- State Presentations Continued

Ohio Department of Natural Resources:

Charles Banks, GIMS Specialist

West Virginia Geological and Economic Survey:

Nick Fedorko, Head -- Coal Program

Indiana Geological Survey:

Licia Weber, Director, Coal Mine Information System

3:15 p.m. -- BREAK

3:30 p.m. -- State Presentations Continued

Illinois Department of Natural Resources:

Robert Gibson, Emergency Section Supervisor

Kentucky Geological Survey

Jerry Weisenfluh, Geospacial Analysis Section

Utah Division of Oil, Gas, and Mining

Wayne Western, Environmental Specialist

5:30 p.m. -- RECEPTION (Sponsored by IMCC)

DAY TWO -- October 16, 2003

8:30 a.m. -- Roundtable Discussions

Session I: Acquiring and Preserving Map Images

Moderator:

Kelvin Wu (MSHA)

Presenters:

Robert Gibson (IL); *Daniel Kestner* (VA);

Bill Bookshar (PA); *Greig Robertson*, (OSM)

Registrant List
IMCC / MSHA / OSM Benchmarking Workshop
The Galt House, Louisville, Kentucky – October 15-16, 2003

<p>Army, Stephen Mined Land Recl. Spec. II NYSDEC 6274 E. Avon-Lima Road Avon, NY 14414 Ph: 545.226.5372 smarmy@gw.dec.state.ny.us</p>	<p>Arneson, Chris GIS Hydrologist WY – TriHydro Corp. 920 Sheridan Street Laramie, WY 82070 Ph: 307.745.7474 carneson@trihydro.com</p>
<p>Banks, Charles GIMS Specialist OH Geological Survey 4383 Fountain Square Drive Columbus, OH 43224 Ph: 614.265.6588 charles.banks@dnr.state.oh.us</p>	<p>Barkley, Daniel Mining Engineer IDNR Office of Mines & Minerals One Natural Resources Way Springfield, IL 62701-1271 Ph: 217.785.5197 dbarkley@dnrmail.state.il.us</p>
<p>Bates, Ken Manager, GIS Branch KY Natural Resources & Env. Prot. Cabinet 500 Mero Street, 14th Floor Frankfort, KY 40601 Ph: 502.564.5174 ken.bates@mail.state.ky.us</p>	<p>Beechie, Bruce Environmental Scientist ND Public Service Commission 600 E. Boulevard – 13th Floor Bismarck, ND 58505-0480 Ph: 701.663.4076 beb@psc.state.nd.us</p>
<p>Bookshar, William Engineering Supervisor 2 PA DEP/Bureau of Deep Mine Safety 100 New Salem Road, Room 167 Fayette Health Center Uniontown, PA 15401 Ph: 724.439.7469 wbookshar@state.pa.us</p>	<p>Bourland, Mike Environmental Engineer Sr. Mines & Minerals IA Dept. of Agriculture 502 East 9th – Wallace Bldg. Des Moines, IA 50319 Ph: 515.242.6130 mike.bourland@idals.state.ia.us</p>
<p>Brown, Sandra Sr. Environmental Protection Specialist CO Division of Minerals & Geology 1313 Sherman Street, Room 215 Denver, CO 80203 Ph: 303.866.4927 sandy.brown@state.co.us</p>	<p>Bunch, Bryan Geoprocessing Specialist KY Nat. Res. & Env. Prot. Cabinet 500 Mero Street, 14th Floor Frankfort, KY 40601 Ph: 502.564.5174 bryan.bunch@mail.state.ky.us</p>
<p>Carroll, Chris Coal Geologist</p>	<p>Carter, Debbie Geologist</p>

<p>CO Geological Survey 1313 Sherman St., #715 Denver, CO 80203 Ph: 303.866.3501 carroll_chris@msn.com</p>	<p>US Geological Survey 956 National Center Reston, VA 20192 Ph: 703.648.6413 mdcarter@usgs.gov</p>
<p>Cecca, E. Larry General Engineer US DOL/MSHA 1100 Wilson Blvd. Room 2332 Arlington, VA 22209 Ph: 202.693.9480 cecca.elio@dol.gov</p>	<p>Chenoweth, Cheri Geologist IL State Geological Survey 615 E. Peabody Champaign, IL 61820 Ph: 217.244.4610 cheri@isgs.uiuc.edu</p>
<p>Conrad, Greg Executive Director Interstate Mining Compact Commission 445-A Carlisle Drive Herndon, VA 20170 Ph: 703.709.8654 gconrad@imcc.isa.us</p>	<p>Craynon, John Chief, Division of Tech Support Office of Surface Mining 1951 Constitution Ave., NW, MS203 Washington, DC 20240 Ph: 202.208.2866 jcraynon@osmre.gov</p>
<p>Crowell, Doug Geology Program Supervisor OH Geological Survey 4383 Fountain Square Drive Columbus, OH 43224 Ph: 614.265.6594 doug.crowell@dnr.state.oh.us</p>	<p>Davis, Tamara Natural Resource Planner MD Bureau of Mines 160 S. Water Street Frostburg, MD 21502 Ph: 301.689.6764, Ext. 214 tdavis@allconet.org</p>
<p>Dieringer, Tim Division Chief Federal Reclamation Program Office of Surface Mining 3 Parkway Center Pittsburgh, PA 15220 Ph: 412.937.2145 tdiering@osmre.gov</p>	<p>Donnelly, Sarah Office of Surface Mining 1951 Constitution Ave., NW Washington, DC 20240 Ph: 202.208.2826 sdonnell@osmre.gov</p>
<p>Dunn, Mike Geologist OSM, ARCC 3 Parkway Center Pittsburgh, PA 15220 Ph: 412.937.2910</p>	<p>Fedorko, Nick Head, Coal Program WV Geological & Economic Survey PO Box 879 Morgantown, WV 26507-0879 Ph: 304.594.2331</p>

mldunn@osmre.gov	fedorko@geosrv.wvnet.edu
<p>Fulton, Jim Chief, Denver Field Division OSM 1999 Broadway, Suite 3320 Denver, CO 80202 Ph: 303.844.1400, Ext. 1424 jfulton@osmre.gov</p>	<p>Gibson, Robert Emergency Section Supervisor IL Dept of Natural Resources AMLR Division SIUE – Box 1459 Alumni Hall, Room 1319 Edwardsville, IL 62026 Ph: 618.650.3197 rgibson@siue.edu</p>
<p>Harding, Ed Geoprocessing Specialist Division of Technical Support Revenue Cabinet 200 Fair Oaks Lane Frankfort, KY 40620 Ph: 502.564.8334 ed.harding@mail.state.ky.us</p>	<p>Monte Hieb Office of Miners Health, Safety & Training 142 Industrial Drive Oak Hill, WV 25901 Ph: 304.469.8100</p>
<p>Hiett, John KY Dept. of Mines & Minerals 1025 Capital Center Drive Frankfort, KY 40602 Ph: 859.573.0140 John.Hiett@mail.state.ky.us</p>	<p>Higginbotham, John Engineer Office of Miners' Health, Safety & Training 1301 Airport Road Beaver, WV 25813-9426 Ph: 304.256.3269 jhigginbotham@mines.state.wv.us</p>
<p>Hohmann, Steve Director KY Abandoned Mine Lands 2521 Lawrenceburg Road Frankfort, KY 40601 Ph: 502.564.2141 steve.hohmann@mail.state.ky.us</p>	<p>Hooker, Alan Geologist MD Bureau of Mines 160 S. Water Street Frostburg, MD 21502 Ph: 301.689.6764, Ext. 201 ahooker@allconet.org</p>
<p>Horner, Aaron Director Division of Tech Support, Revenue Cabinet 200 Fair Oaks Lane Frankfort, KY 40620 Ph: 502.564.8334 aaron.horner@mail.state.ky.us</p>	<p>Howes, Mary Geologist IA Geological Survey Bureau IA DNR 109 Trowbridge Hall Iowa City, IA 52242-1319 Ph: 319.335.1448 mhowes@igsb.uiowa.edu</p>

<p>Jones, Nick Geologic Research Assistant WY State Geological Survey PO Box 3008 Laramie, WY 82071 Ph: 307.766.2286, Ext. 243 njones@uwyo.edu</p>	<p>Keith, Don Mine Inspector Mine Safety & Inspection 11 West Oxmoor Road, Suite 100 Birmingham, AL 35209 Ph: 205.254.1275</p>
<p>Kestner, Daniel Information Technology Specialist VA Dept. of Mines, Minerals & Energy PO Drawer 900 Big Stone Gap, VA 24219 Ph: 276.523.8193 dxk@mme.state.va.us</p>	<p>Leavitt, Alysia Management Analyst NM Energy, Minerals & Natural Res. Dept. Mining and Minerals Div. 1220 South St. Francis Dr. Santa Fe, NM 87505 Ph: 505.476.3408 aleavitt@state.nm.us</p>
<p>Lewis, John Mining Engineer Bureau of Land Management 1849 C Street NW, LS-501 Washington, DC 20240 Ph: 202.783.6547 John_A_Lewis@blm.gov</p>	<p>Lighty, Robin G. Program Manager Data Management and Reports PA Bureau of Mining and Reclamation Rachel Carson State Office Bldg. 400 Market Street Harrisburg, PA 17105 Ph: 717.783.9588 rolighty@state.pa.us</p>
<p>Luppens, James Project Chief USGS 12201 Sunrise Valley Dr., MS 956 Reston, VA 20192 Ph: 703.648.6460 jluppens@usgs.gov</p>	<p>McDonald, James GIS Specialist OH Division of Geological Survey 4383 Fountain Square Drive Columbus, OH 43224-1362 Ph: 614.265.6601 jim.mcdonald@dnr.state.oh.us</p>
<p>Meier, Leonard (Len) Physical Scientist OSM – Mid-Continent Region 501 Belle Street Alton, IL 62002 Ph: 618.463.6460 lmeier@osmre.gov</p>	<p>Metzger, Jim Division of Reclamation Department of Natural Resources RR #2, Box 129 Jasonville, IN 47438-9517 Ph: 812.665.2207 jmetzger@reclamation.dnr.state.in.us</p>
<p>Meyer, Becky GIS Database Analyst Coal Mine Information System</p>	<p>Michalek, Stanley Supvy. Civil Engineer US DOL – MSHA</p>

<p>IN Geological Survey 611 N Walnut Grove Bloomington, IN 47405 Ph: 872.855.6641 reameyer@indiana.edu</p>	<p>626 Cochrans Mill Road Pittsburgh, PA 15236 Ph: 412.386.6974 michalek.stanley@dol.gov</p>
<p>Morris, Albert Engineering – Hydrologist IN Division of Reclamation 402 N. Wolfe Sullivan, IN 47882 Ph: 812.665.2207</p>	<p>Mulvany, Pat Geologist MO Geological Survey 111 Fairgrounds Road Rolla, MO 65401 Ph: 573.368.2139 nrmulvp@mail.dnr.state.mo.us</p>
<p>Ken Nelson KS Geological Survey – Univ. of KS 1930 Constant Ave. – West Campus Lawrence, KS 66047-3726 Ph: 785.864.2192</p>	<p>Owens, Harold Mine Safety & Health Specialist 100 Bluestone Road Mt. Hope, WV 25880 Ph: 304.877.3900 owens.harold@dol.gov</p>
<p>Penfield, John Chief Info. Officer KY Nat. Res. & Env. Prot. Cabinet 500 Mero Street, 14th Floor Frankfort, KY 40601 Ph: 502.564.5174 john.penfield@mail.state.ky.us</p>	<p>Pierce, Paul State Mine Inspector NM Bureau of Mines Inspection 801 Leroy Place Socorro, NM 87801 Ph: 515.835.5460 ppierce@admin.nmt.edu</p>
<p>Pierce, Brenda Energy Program Coordinator US Geological Survey/Energy Program 12201 Sunrise Valley Dr., MS 915A Reston, VA 20192 Ph: 703.648.6421 bpierce@usgs.gov</p>	<p>Potter, Steven Director Bureau of Resource Mgmt. & Dev. NYSDEC 625 Broadway Albany, NY 12233-6500 Ph: 518.402.8071 smpotter@gw.dec.state.ny.us</p>
<p>Pritchard, Mary Ann Director OK Dept. of Mines 4040 N Lincoln Blvd, Suite 107 Oklahoma City, OK 73105 Ph: 405.521.3859, Ext. 22</p>	<p>Radden-Lesage, William Mining Engineer Bureau of Land Management MS 501 LS, 1849 C Street, NW Washington, DC 20240 202.452.0360 Bill_Lesage@blm.gov</p>

<p>Reid, Jeff Senior Geologist – Minerals and OIS NC Geological Survey 1612 Mail Service Center Raleigh, NC 27699-1612 Ph: 919.733.2423, Ext. 403 jeff.reid@ncmail.net</p>	<p>Robertson, Greig Program Specialist PA – OSM 3 Parkway Center Pittsburgh, PA 15220 Ph: 412.937.3001 groberts@osmre.gov</p>
<p>Schaeffer, Stanley Civil Engineer US DOL – MSHA 626 Cochrans Mill Road Pittsburgh, PA 15236 Ph: 412.386.6869 schaeffer.stanley@dol.gov</p>	<p>Seeger, Cheryl Geologist MO Geological Survey 111 Fairgrounds Road Rolla, MO 65401 Ph: 573.368.2184 nrseegc@mail.dnr.state.mo.us</p>
<p>Sharp, Mike Director of Information Technology OK Conservation Commission 2800 N. Lincoln Blvd., Suite 160 Oklahoma City, OK 73105 Ph: 405.521.4813 mikes@okcc.state.ok.us</p>	<p>Sherer, Erik Mine Safety & Health Specialist 1100 Wilson Blvd. Arlington, VA 22209 Ph: 202.693.9523 sherer.hubert@dol.gov</p>
<p>Skates, Michael Land Reclamation Specialist III AL Dept. of Industrial Relations Mining & Reclamation Division 649 Monroe Street Montgomery, AL 36131-5200 Ph: 334.242.8265</p>	<p>Taranto, Joseph Mining Permit and Compliance Specialist PA Dept. of Environmental Protection 25 Technology Drive Coal Center, PA 15423 Ph: 724.769.1025 jtaranto@state.pa.us</p>
<p>Tewalt, Susan Geologist USGS MS 956 National Center Reston, VA 20192 Ph: 703.648.6437 stewart@usgs.gov</p>	<p>Trainor, Larry Mine Safety & Health Specialist 1100 Wilson Blvd. Arlington, VA 22209 Ph: 202.693.9644 trainor.lawrence@dol.gov</p>
<p>Wampler, Benny R. Deputy Director VA Dept. of Mines, Minerals & Energy PO Drawer 900 3405 Mountain Empire Road</p>	<p>Weber, Licia Geologist, Director IN Coal Mine Information System IN Geological Survey 611 N. Walnut Grove</p>

<p>Big Stone Gap, VA 24219 Ph: 276.523.8145 brw@mme.state.va.us</p>	<p>Bloomington, IN 47405 Ph: 812.855.1364 weber@indiana.edu</p>
<p>Western, Wayne Environmental Scientist III UT Division of Oil, Gas & Mining 1594 W North Temple, Suite 1210 Salt Lake City, UT 84114-5801 Ph: 801.538.5263 waynewestern@utah.gov</p>	<p>Wu, Kelvin Chief, Mine Waste Division US DOL – MSHA 626 Cochrans Mill Road Pittsburgh, PA 15236 Ph: 412.386.6903 wu.kelvinkekang@dol.gov</p>
<p>Weisenfluh, Jerry Geologist KY Geological Survey 228 Mining and Minerals Bldg., U of KY Lexington, KY 40506-0107 Ph: 859.257.5500, Ext. 114 jerryw@uky.edu</p>	

Evaluation Form

IMCC Intergovernmental Benchmarking Workshop on Underground Mine Mapping October 15 and 16, 2003 – The Galt House Hotel – Louisville, KY

Thank you for attending the IMCC Intergovernmental Benchmarking Workshop on Underground Mine Mapping. We hope you found it helpful, enlightening and useful. Please rate the various sessions/presentations conducted during the workshop using the following scale: 1 = Poor; 5 = Excellent

Panel I: Federal Agency Presentations

- **MSHA Presentation** 1 2 3 4 5
- **OSM Presentation** 1 2 3 4 5
- **USGS Presentation** 1 2 3 4 5
- **BLM Presentation** 1 2 3 4 5

Part II: State Presentations on Underground Mine Mapping Benchmarks

- **Pennsylvania DEP Presentation** 1 2 3 4 5
- **Virginia DMME Presentation** 1 2 3 4 5
- **Ohio DNR Presentation** 1 2 3 4 5
- **West Virginia GS Presentation** 1 2 3 4 5
- **Indiana GS Presentation** 1 2 3 4 5
- **Illinois DNR Presentation** 1 2 3 4 5
- **Kentucky GS Presentation** 1 2 3 4 5
- **Utah DOGM Presentation** 1 2 3 4 5

Part III: Roundtable Discussions re. Specific Underground Mine Mapping Issues

- **Roundtable Session I: Acquiring and Preserving Mine Maps** 1 2 3 4 5
- **Roundtable Session II: Moving Maps to GIS** 1 2 3 4 5
- **Roundtable Session III: Access/Sharing Information** 1 2 3 4 5
- **Roundtable Session IV: Moving Into the Future** 1 2 3 4 5

Meeting Facilities 1 2 3 4 5

Overall Workshop Format 1 2 3 4 5

Accommodations 1 2 3 4 5

Workshop Materials 1 2 3 4 5

Overall rating/comments on the quality/helpfulness of the workshop and the information presented:

Other suggestions or comments regarding the workshop (things you liked; things you would change for future benchmarking workshops):

Suggested follow-up/next steps:

Suggested topics for future benchmarking workshops:

NAME (optional): _____

AGENCY (optional): _____

MSHA Perspective

Kelvin Wu, Ph.D., P.E.

Chief, Mine Waste and Geotechnical Engineering Division

Pittsburgh Safety & Health Technology Center



Abandoned Coal Mines

State	No. of Abandoned Mines
Kentucky	150,000
West Virginia	100,000
Pennsylvania	40,000
Virginia	6,000

Undetected Mine Voids Can Present Hazards to:

- Active Mines

Active Mines: Inundation Accidents

- From 1995 through June 2002, mine operators reported 181 mine inundations.
- Of these, at least 107 were unplanned cut-throughs that resulted in water inundations.



Notable Example: Quecreek Mine Inundation Accident, July, 2002

Mine Voids Can Present Hazards to:

- Active Mines
- **Impoundments**

Impoundment Breakthrough Incidents

Recent Examples:

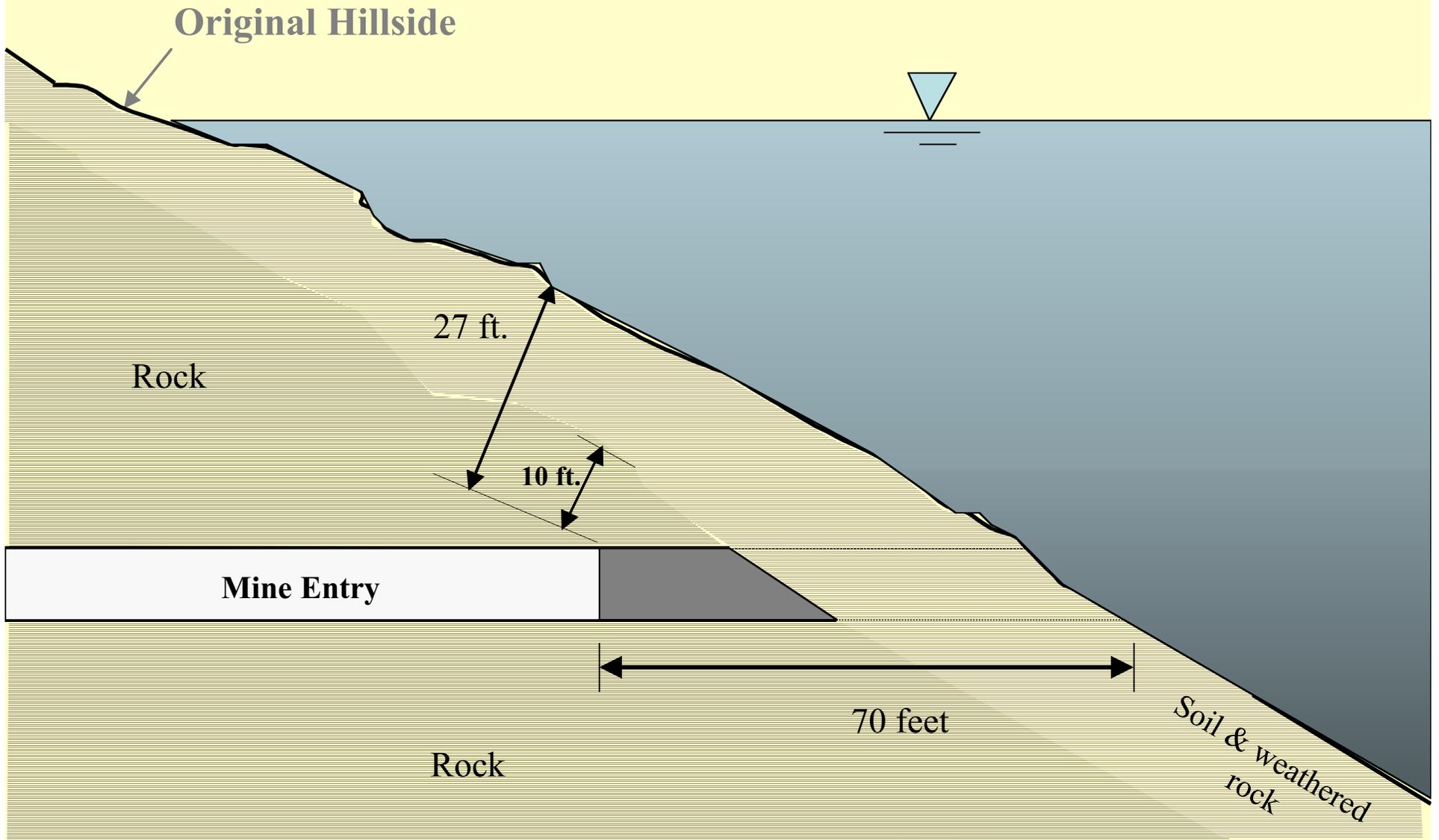
- Miller's Cove, Lee Co. VA, August, 1996
- Miller's Cove, Lee Co. VA, October, 1996
- Buchanan, Buchanan Co. VA, November, 1996
- Big Branch, Martin Co., KY, October, 2000



Big Branch Refuse Impoundment

**Over 300 million gallons of slurry
released into underground mine in
October, 2000.**

Example of potential for breakthrough created by mine workings located near an impoundment.



Example: Verification of mine workings by drilling at KY impoundment site in 2001

The area had been surface mined in the 1970s.

Room and pillar mining took place in the area from 1985 to 1995.

Mine opening uncovered in impoundment area. →

Results of horizontal drilling shown on next slide.



Outcrop Barrier Distances Taken From Mine Map Versus Drilling Results

Expected horizontal distance to mine workings from highwall, <u>based on mine map</u> , feet.	Actual horizontal distance to mine workings from highwall, <u>based on drilling</u> , feet.	Discrepancy , that is, workings were actually this much closer or farther from highwall than shown on mine map.
40	37.5	2.5 feet closer
122	92	30 feet closer
137	89	48 feet closer
27	67	40 feet farther
67	41	26 feet closer

MSHA has addressed the Impoundment Safety issue by:

- Providing training at Annual MSHA Impoundment Seminar.
- Increasing emphasis, during impoundment plan reviews, on ensuring that:
 - 1. Sufficient exploration is done to accurately locate mine workings near impoundments;
 - 2. Appropriate engineering analyses of potential impacts are performed;
 - 3. Adequate breakthrough prevention measures are taken; and
 - 4. Site performance is adequately monitored.

Improved Mine Mapping

- MSHA is working with the Interstate Mining Compact Commission (IMCC)
- A Steering Committee had been formed.
- A workshop is being planned to discuss:
 - Improving mine map accuracy,
 - Digitizing mine maps

MSHA Initiative: “Symposium on Geotechnical Methods for Mine Map Verification”



- Held October 29, 2002 in Charleston, WV
- Eighteen presentations covering a variety of methods.
- Panel discussions.
- Display booths for related products and services.
- Attended by 400 people.

Projects to Demonstrate Technologies for Detecting Underground Mine Voids

- Congress allocated funds to MSHA for this purpose.
- MSHA published a Pre-solicitation on May 8, 2003.



B -- Technology in detecting underground mine voids

General Information

Solicitation Number:	B2532516
Posted Date:	May 08, 2003
Original Response Date:	May 22, 2003
Current Response Date:	May 22, 2003
Original Archive Date:	Jun 06, 2003
Current Archive Date:	Jun 06, 2003
Classification Code:	B -- Special studies and analysis - not R&D

- Purpose: “The U.S. Department of Labor, Mine Safety and Health Administration is seeking sources to conduct demonstration projects for advancing the current state of technology in detecting underground mine voids.”
- An “Industry Day” will be held in the near future with presentations from interested bidders.

Updating of “Engineering and Design Manual: Coal Waste Disposal Facilities”

- Original “Design Manual” published in 1975.
- Important issues, such as breakthrough potential, and the use of geophysical methods, not addressed in detail.



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OSM's Underground Mine Map Initiative

John R. Craynon, P.E.

Chief, Division of Technical Support
Office of Surface Mining
Washington, DC

A vertical strip on the left side of the slide shows a fragment of a topographic map with contour lines and a grid.

Reasons for needing accurate underground mine maps

- Breakthrough prevention (impoundments, mines)
- Subsidence prediction/avoidance
- Underground mine pools
- AMD issues
- CCB placement

Bottom line: Protection of miners, the public, and the environment

A vertical strip on the left side of the slide shows a topographic map with contour lines and a yellow path. The background of the slide is dark teal with light teal contour lines.

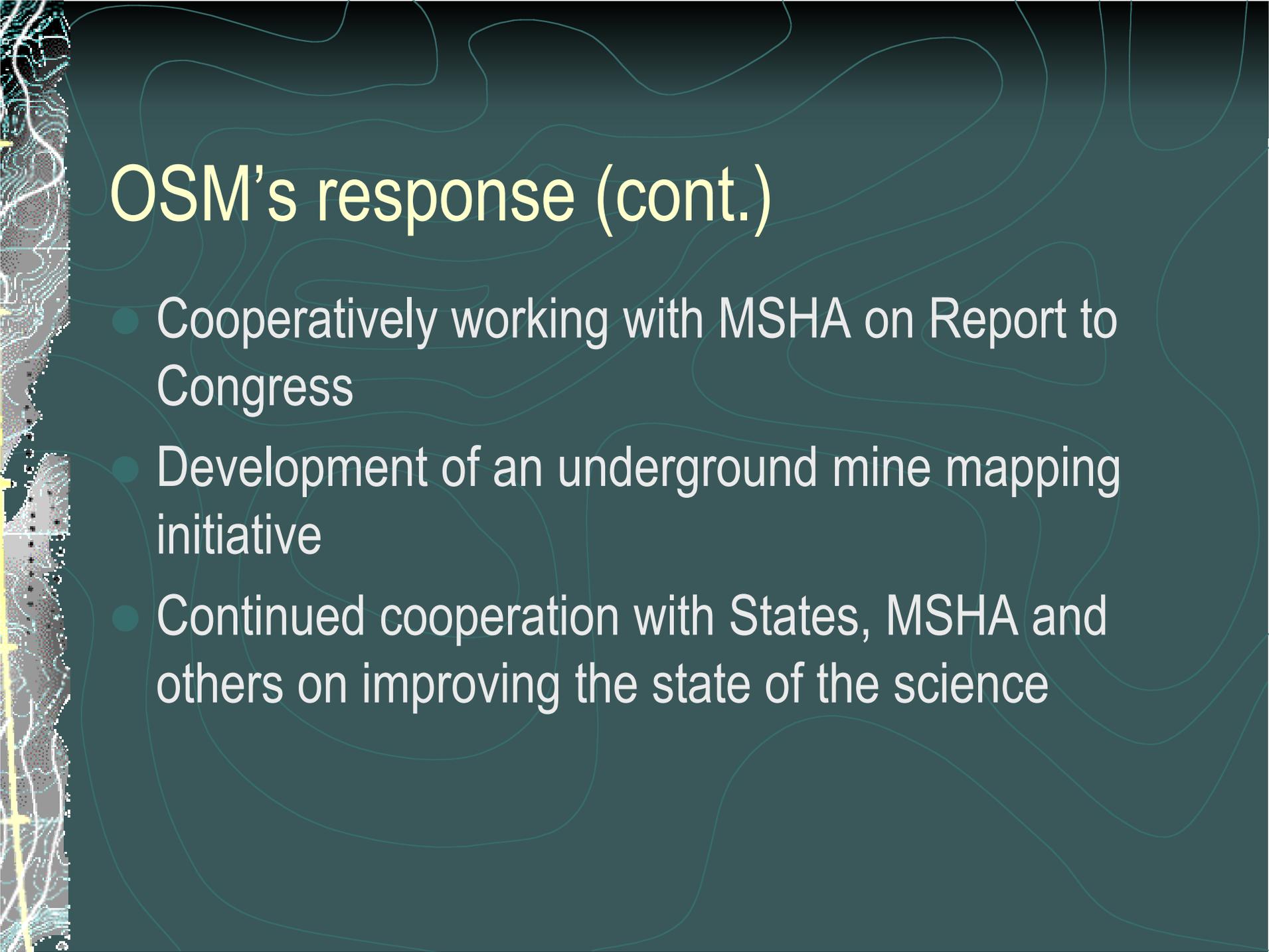
Two Significant “Triggering” Events

- Martin County Coal Company impoundment failure in Kentucky, October, 2000
- Quecreek Mine breakthrough in Pennsylvania, July 2002



OSM's response

- Cooperation on National Research Council study and report
- Formation of joint technical working group with MSHA
- Cooperative efforts with the States and MSHA to address technical issues and NRC recommendations

The background of the slide is a dark teal color with faint, light blue contour lines. On the left side, there is a vertical strip showing a detailed topographic map with contour lines and a yellow vertical line.

OSM's response (cont.)

- Cooperatively working with MSHA on Report to Congress
- Development of an underground mine mapping initiative
- Continued cooperation with States, MSHA and others on improving the state of the science



NRC Report

- Mandated by Congress following the MCCC incident
- Focused on slurry impoundments in a broad sense rather than on MCCC
- Completed by October 2001
- Included 28 recommendations for action by MSHA and OSM



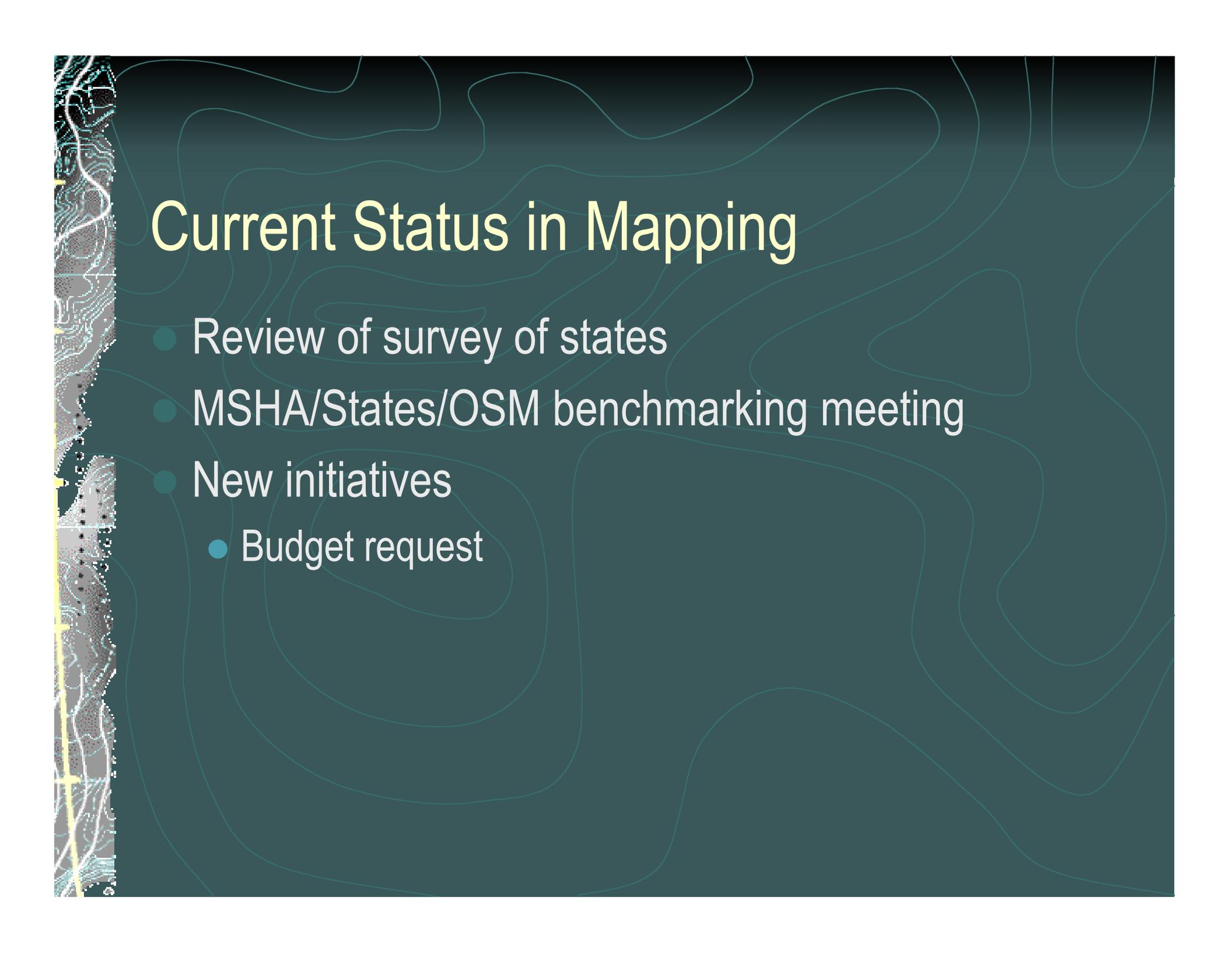
NRC recommendations

- OSM and MSHA grouped into 6 categories
 - Administrative Issues
 - Technical Review Issues
 - Mine Surveying and Mapping Issues
 - Use of Geophysical Methods
 - Chemical Properties of Coal Waste
 - Alternative Coal Waste Disposal Methods

A vertical strip on the left side of the slide shows a fragment of a topographic map with contour lines and a grid.

Primary technical issues

- Technical review criteria
 - Siting, failure evaluation, etc.
- Mapping standards
 - Map availability and quality
- Geophysical techniques



Current Status in Mapping

- Review of survey of states
- MSHA/States/OSM benchmarking meeting
- New initiatives
 - Budget request



Summary of OSM Initiative

- Includes and builds on ongoing State and Federal efforts
- Builds on TIPS and other OSM/State partnerships
- Focused on delivering the needed product and capacity building



Issues of concern

- Getting maps into digital format
- Managing data and data standards
- Georeferencing and GIS issues
- Availability and liability

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Future efforts

- Continued cooperation with the States, MSHA and others to use the best available tools
- Addressing existing mine maps and availability of those maps

A vertical strip on the left side of the slide shows a fragment of a topographic map with contour lines and a grid.

Key Points to Consider

- Cooperation and coordination is necessary
- Understanding the current status is key to identifying future needs
- Funding to improve map availability and quality is necessary



OSM Specifics

- Mine Map Repository – Greig Robertson
- TIPS and Mine Mapping – Len Meier

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National Mine Map Repository

Office of Surface Mining

“What we do and how we do it”

Interstate Mining Compact Commission

October 15 – 16, 2003

Louisville, KY

History – Mine Map Repository (MMR)

- 1969 MMR established by Congress.
- 1970 Placed under DOI (Bureau of Mines).
Regional offices established:
 - Pittsburgh, PA
 - Wilkes Barre, PA (anthracite only)
 - Denver, CO (disbanded 1982)
 - Spokane, WA (disbanded 1982)
 - Juneau, AK (disbanded 1982)
- 1983 Pittsburgh and Wilkes Barre offices transferred to OSM from Bureau of Mines.
- 1996 OSM acquires Denver, Spokane and Juneau collections. Establishes Pittsburgh as the National MMR.
- Current - National MMR maintained at OSM in Pittsburgh, PA.
 - Wilkes Barre repository (anthracite only).

Number and Types of Maps

- **132,000 (approximate) maps on microfilm.**
- **108,000 scanned in digital format (TIFF files).**
- **Most (90 %) - - east of the Mississippi.**
- **Primarily coal, some non-coal.**
- **Abandoned mines only; no active operations.**
- **Non-coal includes: iron; feldspar; lead; zinc; tin; salt.**

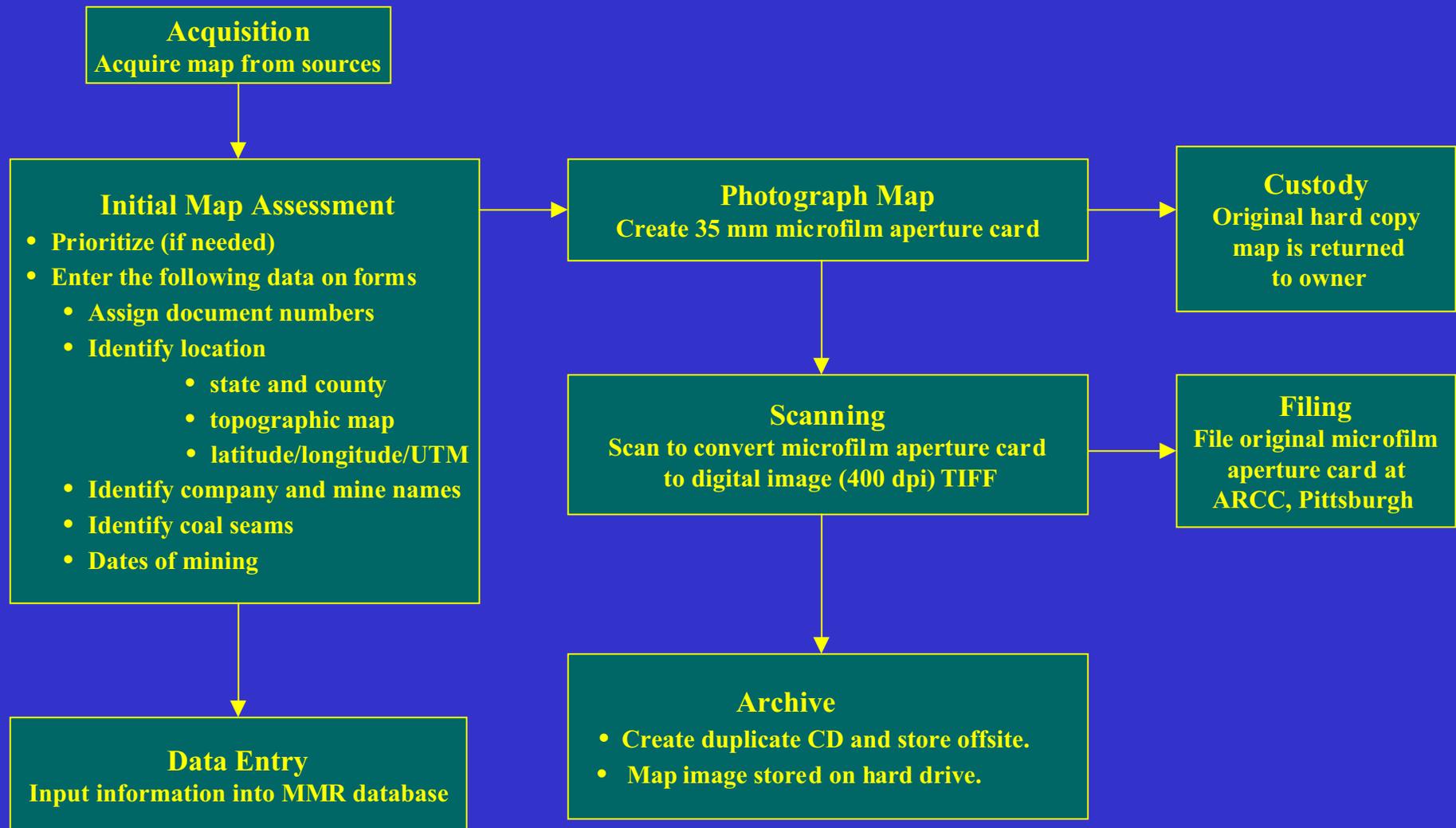
Number of Maps by State

<u>State</u>	<u>Coal Maps</u>	<u>Non-coal Maps</u>	<u>Total</u>	<u>State</u>	<u>Coal Maps</u>	<u>Non-coal Maps</u>	<u>Total</u>
Alabama	59	296	355	Nebraska	0	0	0
Alaska	0	2	2	Nevada	0	940	0
Arizona	0	927	927	New Hampshire	0	230	230
Arkansas	359	2	361	New Jersey	0	378	378
California	0	232	232	New Mexico	4	117	121
Colorado	2293	4747	7040	New York	0	1183	1183
Connecticut	0	475	475	North Carolina	9	1590	1599
Delaware	0	4	4	North Dakota	4	1	5
Florida	0	0	0	Ohio	7684	465	8149
Georgia	15	728	743	Oklahoma	127	605	732
Hawaii	0	0	0	Oregon	0	332	332
Idaho	1	576	577	Pennsylvania	11308	434	11742
Illinois	2327	357	2684	Rhode Island	1	0	1
Indiana	2606	25	2631	South Carolina	0	53	53
Iowa	1	1	2	South Dakota	2	749	751
Kansas	355	246	601	Tennessee	794	619	1413
Kentucky	4754	270	5024	Texas	0	1	1
Louisiana	0	0	0	Utah	76	580	656
Maine	0	541	541	Vermont	1	113	114
Maryland	525	33	558	Virginia	7485	1190	8675
Massachusetts	7	53	60	Washington	174	629	803
Michigan	437	10382	10819	West Virginia	46344	277	46621
Minnesota	0	3068	3068	Wisconsin	0	505	505
Mississippi	0	84	84	Wyoming	493	59	552
Missouri	4	8456	8456				
Montana	7	720	727				
				<u>Total Coal</u>	= 88256		
				<u>Total Non-coal</u>	= 43275		
						<u>Maps Total</u>	= 131531

Sources of Maps

- **State, Federal, local government agencies (e.g. MSHA; state departments mines/geological surveys).**
- **Mining companies.**
- **Engineering companies.**
- **Private citizens.**
- **Libraries.**

Acquisition and Processing of Mine Maps



Clients

- **Regulatory and reclamation staff.**
- **State highway departments.**
- **Homeowners – mine subsidence inquiries.**
- **Local government agencies – emergency planning.**
- **Developers – residential, commercial (malls).**
- **Engineering, mining companies.**
- **Architects, universities, law firms.**
- **Citizens groups.**
- **Environmental consultants.**
- **Pollution control boards.**
- **Realtors.**
- **Law-enforcement agencies, e.g. FBI.**
- **Historical societies.**

Customer Service

- **Provide maps to customers via e-mail.**
- **Provide CD or DVD per customer request.**
- **Provide state agencies with entire inventory of maps in our system.**

Examples:

- **WV Office of Miners, health safety and training.**
- **Ohio Geological Survey.**

Caveats Provided to Customers

- **Maps made by large companies are usually accurate.**
- **Accuracy of maps before 1940 is questionable.**
- **Accuracy of support pillars and barriers between adjacent mines may not be reliable.**
- **Accuracy of the workings shown near the outcrop for shallow mines is questionable.**
- **Older maps often have fewer recognizable surface features, therefore harder to correlate with surface.**















GEORGE YOUNG.

A MAP OF
THE
RHODES & COMPANY'S
MINES & TERRITORY
SITUATE IN
MASSILLON O.

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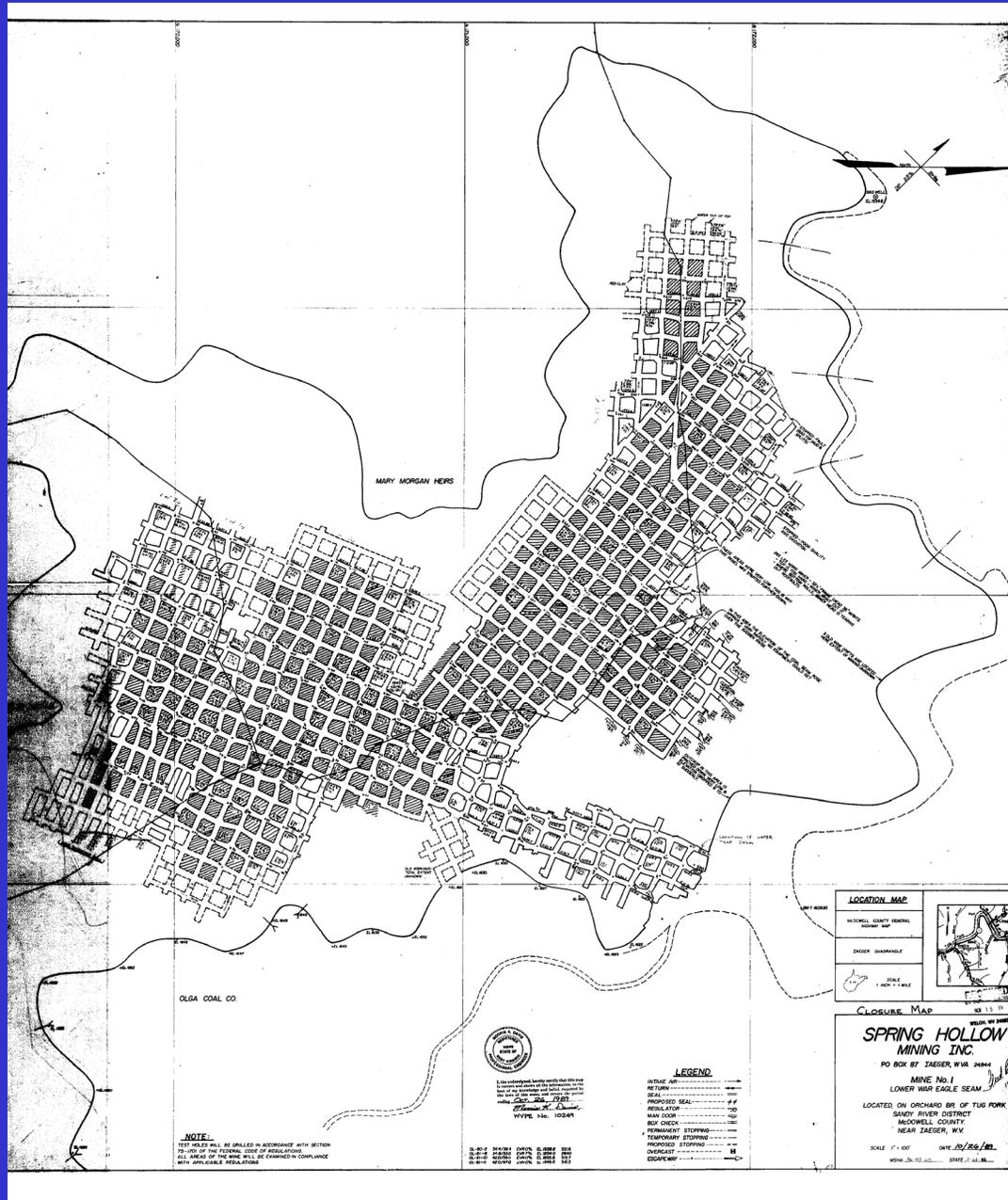
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Drawn & Engraved
OCT. 1875

SCALE 1/4" FEET TO THE INCH.

C. R. Mathews
C. E. M. ENGINEER
YOUNG & YOUNG

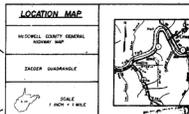


NOTE:
 THIS FIELD PLAN IS DRAUGHTED IN ACCORDANCE WITH SECTION 75-1-10 OF THE FEDERAL CODE OF REGULATIONS.
 ALL AREAS OF THE WORK SHALL BE CARRIED IN COMPLIANCE WITH APPLICABLE REGULATIONS.



LEGEND

- INTAKE AIR
- RETURN
- SEAL
- PROPOSED SEAL
- PERMANENT STOPPING
- MAN DOOR
- BOX DOOR
- PERMANENT STOPPING
- TEMPORARY STOPPING
- OVERCAST
- ESCAPEWAY



CLOSURE MAP

MINED BY 1988

SPRING HOLLOW MINING INC.

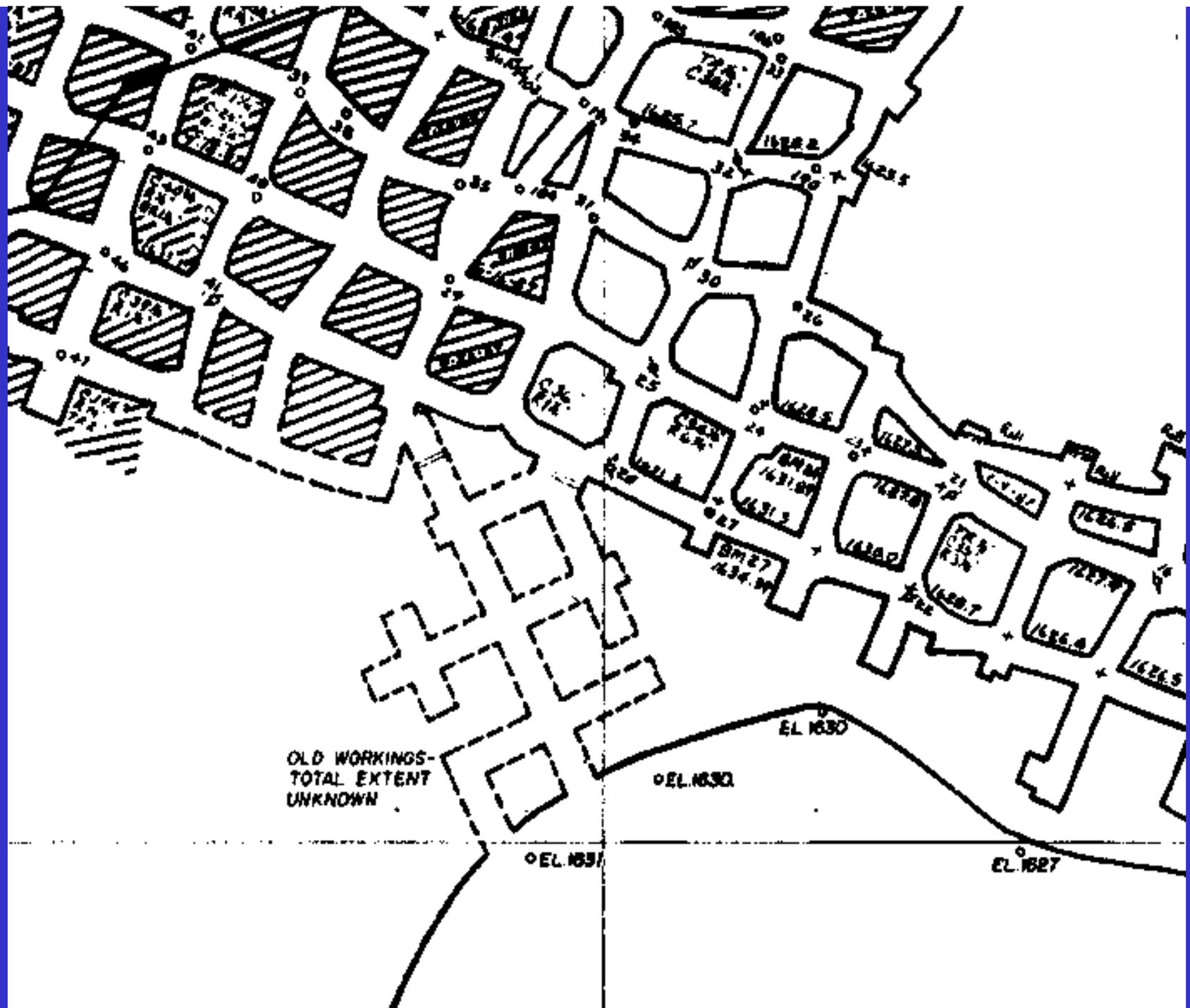
PO BOX 87, IAESER, W.VA. 24844

MINES No. 1
 LOWER WAR EAGLE SEAM

LOCATED ON ORCHARD BR. OF TUG FORK
 SAGEY RIVER DISTRICT
 MCCOYVILLE COUNTY,
 NEAR IAESER, W.V.

SCALE 1" = 100' DATE 12/26/88

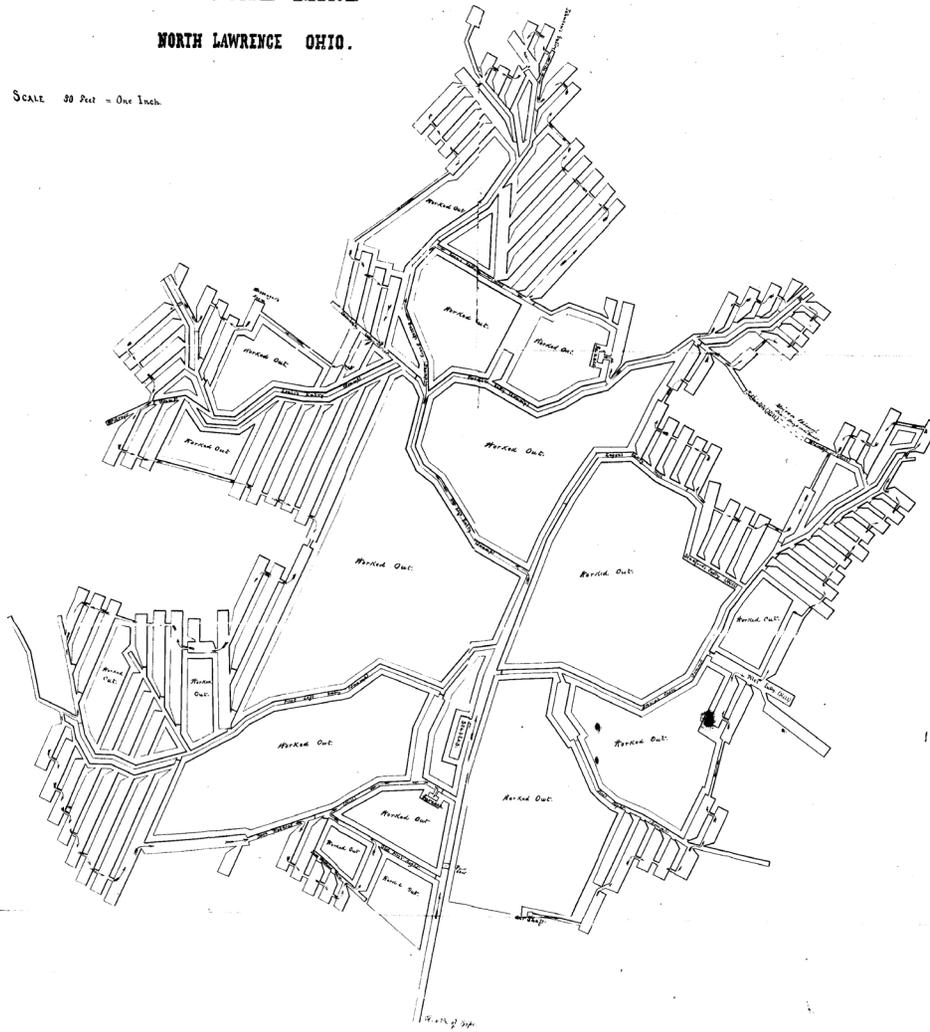
WEST VA. REG. STATE OF W. VA.



MAPLE GROVE COAL MINE

NORTH LAWRENCE OHIO.

SCALE 20 Feet = One Inch.



Jarvis & Brown
Mining Engineers
Massillon,
Ohio.

WATER & BALDRIDGE COAL CO.
 MINE NO. 3
 MSHA ID NO 15-14573
 ID NO 16098 1

ROCKY HOLLOW COAL CO., INC.
 MSHA ID NO 15-16562
 KY ID NO 17610

FRANKLIN COLLIERY MINE NO. 1
 KY FILE NO 176467
 MSHA ID NO 15-16647
 NO. 2 EXPLOSION SCAM

PROGRESS LAND CORP.-MINERAL

ADVERSE PROPERTY

V.R. HALL HEIRS

NOTES: PROPERTY LINES SHOWN ON THIS MAP WERE PROVIDED BY THE
 OPERATOR AND / OR INFORMATION TAKEN FROM THE LATEST
 INFORMATION IN THE COUNTY'S POL OFFICE AND WERE NOT
 INTENDED TO ESTABLISH BOUNDARIES ON THE GROUND.
 INFORMATION ON THIS MAP PRIOR TO MARCH 1997 TAKEN
 FROM MAP PROVIDED BY OTHERS.

Map Submitted By _____ Information Supplied By _____

MM INC.
 MINE MANAGEMENT CONSULTANTS, INC.
 214 N. 10TH ST., SUITE 200
 COVINGTON, KY 40301

<ul style="list-style-type: none"> Intake Air Shaft Return Air Shaft Primary Conveyor Secondary Conveyor Escalator Escalator-Intersect Shaft Hoisting, Wind Sear Proposed Stopping Temporary Stopping Track Center Track Doors 	<ul style="list-style-type: none"> Active Or Dr Gas Vent Inactive Or Dr Gas Vent New Track New Fan Walkway Regulator Proposed Sear Sear Lump Or Water Pool New Projection 	<ul style="list-style-type: none"> Survey Point Charging Station Property Line Survey Point Working Point Core Hole Evaluation Point U.S. Survey Point
--	--	--

DAVE'S BRANCH INC.
 GENERAL DELIVERY
 KITE KY 41828
 MINE NO. 2 of 30
 FINAL MAP 15-15120

Scale: 1" = 100' (Horizontal)
 1" = 100' (Vertical)

Engineer's Signature: *David S. Smith*
 Registration Number: 16228
 Subscribed before me, a Notary Public this 22nd day of April, 1997.
 My Commission expires May 22, 1998.
 Notary Signature: *Stephen R. Smith*

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

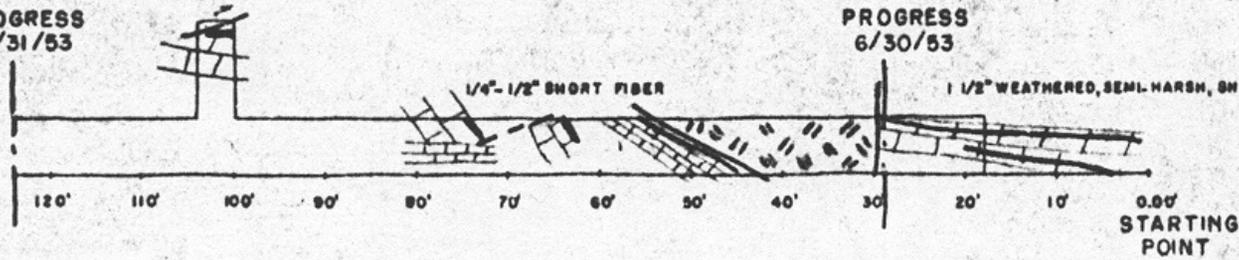
DMA-1776X, Contract Idm-E419, Sorsen Asbestos Corporation
Salt River Asbestos Claims
Gila County, Arizona

Completion Report

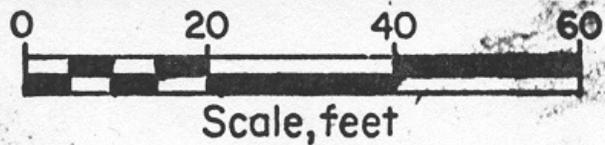
Robert W. Ageton, Mining Engineer
U.S. Bureau of Mines

October 1953

PROGRESS
7/31/53



SECTION A - A'



Scale, feet

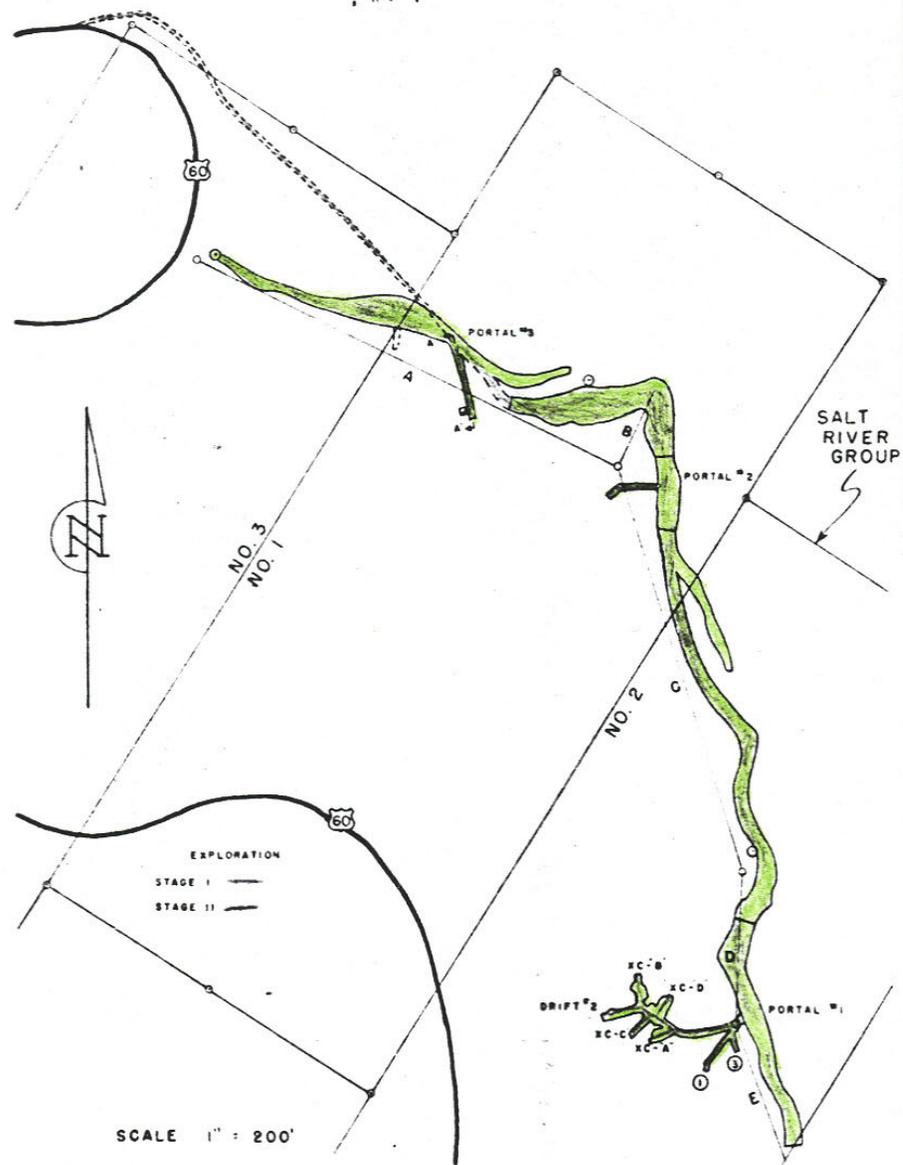
SCALE 1" = 20'

DMEA DOCKET 1776-A
CONTRACT Idm - E419

AUGUST 10, 1953

FIGURE 4

SECTION A - A - PORTAL NO. 3 - SORSEN - WILLIAMS MINING CO.



SEPT. 1953

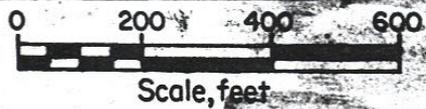
DMEA-1776-X

CONTRACT Idm-E-419

FIGURE 2

CLAIM AND MINE MAP

SORSEN ASBESTOS CORPORATION



Web Site Development

Purpose:

- Create a web site with national database.
- Provide online retrieval of maps and related information.
- Provide links to state mine map resources on the web.

Current activity:

- Prototype being developed for Glassport, PA quadrangle.
- Geo-referencing of mine maps to world co-ordinates.

A few issues requiring resolution:

- Same-named streets.
- Locations in rural areas.
- Multiple coal seams.
- New construction, developments.
- Accessible to the disabled (use of colors).
- Overburden calculations.
- Accurate, up-to-date street software.

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History Mail Print Edit Discuss

Address <http://192.243.129.8/scripts/esimap.dll?name=MineMaps&cmd=novice> Go Links >>

U. S. Department of the Interior

Office of Surface Mining

Mine Map Repositories



Create maps showing where coal has been underground mined in western Pennsylvania. You may create a map for a selected **Street Address** or **Street/Road Name** or **ZIP Code** or **County** or **Longitude/Latitude**. You may then zoom in or out or recenter the map. (see the file [Detailed Instructions](#)) If coal has been mined under your house you

Create Maps

Return to Mine Map Repositories [Home Page](#)

Public Create Maps - Microsoft Internet Explorer provided by DSM HQ Customer Support Center

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History Mail Print Edit Discuss

Address <http://192.243.129.8/scripts/esimap.dll?name=MineMaps&cmd=pubcreat.htm&sid=9812> Go Links >>

U. S. Department of the Interior

Office of Surface Mining

Mine Map Repositories



Create maps showing where coal has been underground mined in western Pennsylvania by:

Street Address

Street/Road Name

Zip Code

County

Done Internet



U. S. Department of the Interior

Office of Surface Mining

Mine Map Repositories



Search for where coal has been underground mined
by State/Street Address

State and Address

Map Legend

- Pittsburgh Coal Seam
- Upper Freeport Coal Seam
- Redstone Coal Seams
- Counties
- US Interstate Highways
- Major Roads
- Allegheny County Roads
- Rivers
- Lakes
- Latitude and Longitude

Navigate to the area you are interested in using the controls below the map. When you have located the

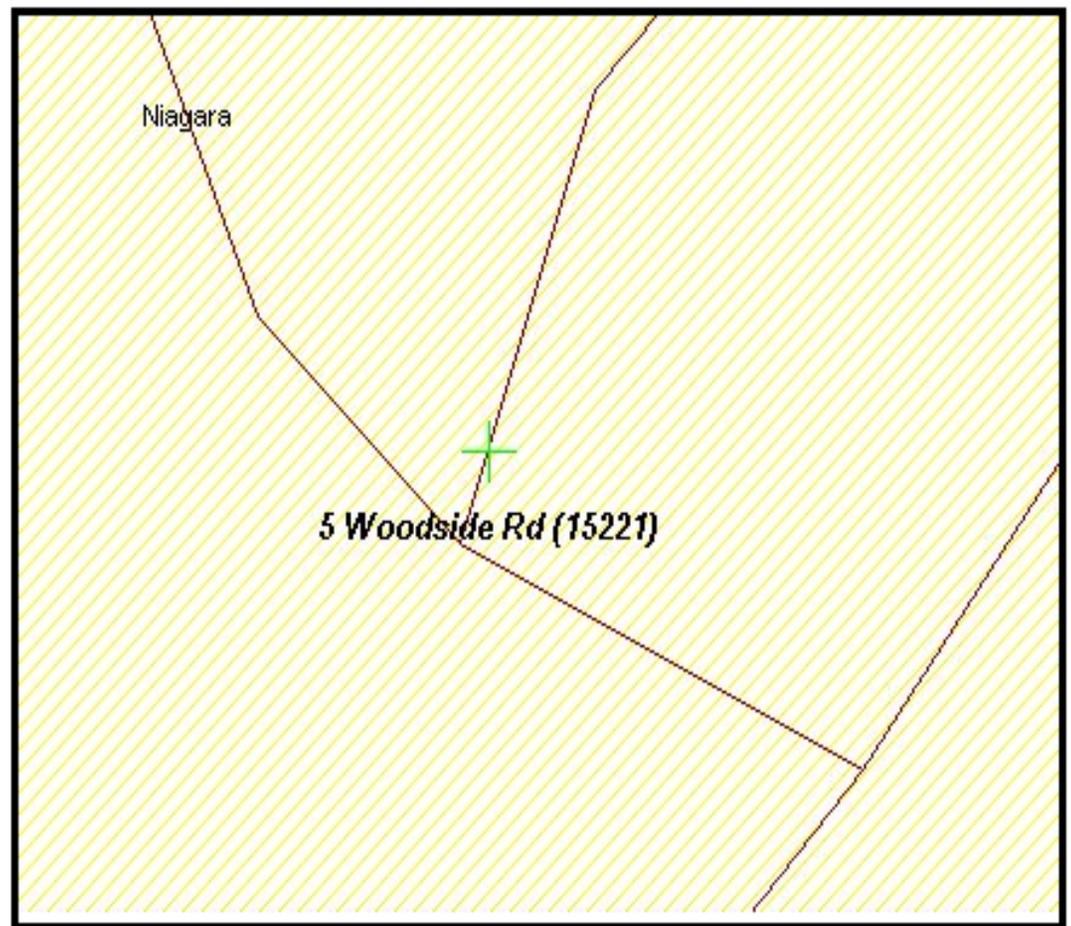


Image size

Zm In
 Zm Out
 Pan More Info.

Coal Mine Information

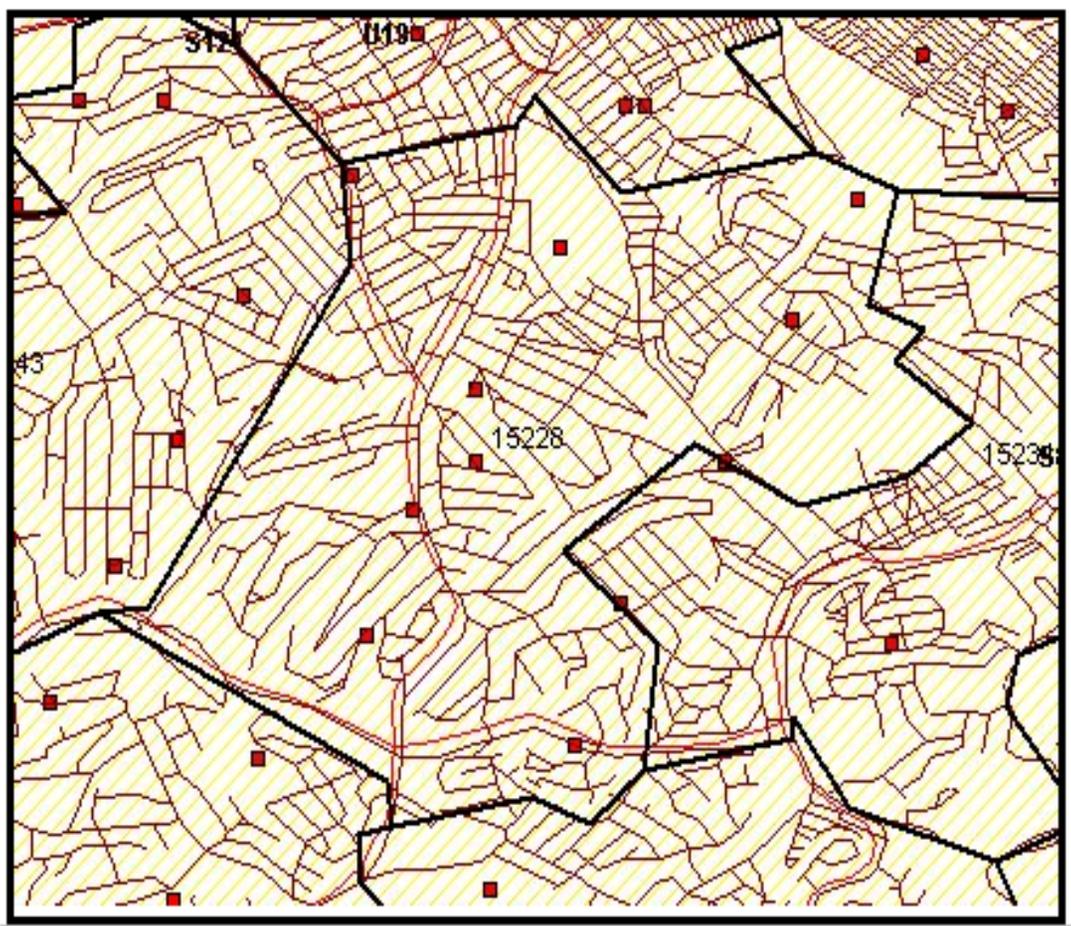
- [Mine Maps](#)
- [WPA Mine Location Maps](#)
- [Pittsburgh Coal Seam](#)
- [Upper Freeport Coal Seam](#)
- [Redstone Coal Seams](#)

Basic Demographic Shapes

- [Counties](#)
- [US Interstate Highways](#)
- [Major Roads](#)

return help redraw

Image size 450x350



Zm In 2X
 Zm Out 2X
 Pan
 Req. Info.

- ### Coal Mine Information
- [Mine Maps](#)
 - [WPA Mine Location Maps](#)
 - [Pittsburgh Coal Seam](#)
 - [Upper Freeport Coal Seam](#)
 - [Redstone Coal Seams](#)
- ### Basic Demographic Shapes
- [Counties](#)
 - [US Interstate Highways](#)
 - [Major Roads](#)
 - [...](#)

return help redraw

Image size 450x350

Identification Items

The following items were near the point you clicked.

Map Number / Mine Name	Options
382457 / MANSFIELD MINE	view download

[Return to Map](#)

Mine Locator - Microsoft Internet Explorer provided by DSM HQ Customer Support Center

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History Mail Print Edit Discuss

Address <http://192.243.129.8/scripts/esimap.dll?name=MineMaps&cmd=PubSrchZip&sid=9811&STATE=PA&ZIP=15228> Go Links >>

[Allegheny County Roads](#)
 [Rivers](#)
 [State Capitals](#)
 [Lakes](#)
 [Latitude and Longitude](#)
 [USA 5-digit Zipcodes](#)
 [USA Cities](#)
 [Quadrangles](#)
 [104th Congr. Distr.](#)

Areas of Special Interest

[OSM Problem Areas](#)
 [Pennsylvania](#)

return help redraw
Image size 450x350

Zm In 2X Zm Out 2X Pan Req. Info.

Internet

Mine Locator - Microsoft Internet Explorer provided by DSM HQ Customer Support Center

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History Mail Print Edit Discuss

Address <http://192.243.129.8/scripts/esimap.dll?name=MineMaps&cmd=PubSrchZip&sid=9811&STATE=PA&ZIP=15228> Go Links >>

[Back to Map Frame Content](#)

- [Allegheny County Roads](#)
- [Rivers](#)
- [State Capitals](#)
- [Lakes](#)
- [Latitude and Longitude](#)
- [USA 5-digit Zipcodes](#)
- [USA Cities](#)
- [Quadrangles](#)
- [104th Congr. Distr.](#)

Areas of Special Interest

- [OSM Problem Areas](#)
- [Pennsylvania](#)

return help redraw

Image size 450x350

Identification Items

The following items were near the point you clicked.

AML Problem Area	Options
PA000591EMA - ABINGTON DRIVE	view
PA000591SGB - ABINGTON DRIVE	view

[Return to Map](#)

Internet

Problem Area PA000591SGB		PA Name ABINGTON DRIVE					
Planning Unit 346		PU Name MOUNT LEBANON					
Longitude 80 5 6		County WASHINGTON					
Latitude 40 16 52		Quadrangle BRIDGEVILLE					
FIPS 42125 Congr. Dist 20		Watershed					
Mining Type: Underground		Surface Owners: none					
Ore Types: none							
Problem		Unfunded		Funded		Completed	
Priority / Prob.Type	Units	Costs	Units	Costs	Units	Costs	
3 / SP	4.0	200,000	0.0	0	0.0	0	

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History Mail Print Edit Discuss

Address <http://192.243.129.8/scripts/esrimap.dll?name=MineMaps&cmd=PubSrchZip&sid=9811&STATE=PA&ZIP=15228> Go Links

- [Allegheny County Roads](#)
- [Rivers](#)
- [State Capitals](#)
- [Lakes](#)
- [Latitude and Longitude](#)
- [USA 5-digit Zipcodes](#)
- [USA Cities](#)
- [Quadrangles](#)
- [104th Congr. Distr.](#)

Identification Items

The following items were near the point you clicked.

AML Problem Area	Options
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U. S. Department of the Interior

Office of Surface Mining

Mine Map Repositories

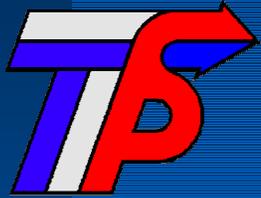


Create Maps showing the general boundaries of where coal has been mined in Western Pennsylvania. Do OSM's Mine Map Repositories have a map(s) of old underground coal mine(s) under land of interest to you? To find out, create a map showing the locations of old underground coal mines whose maps are available at OSM's Mine Map Repository. You may create a map for a selected **Street Address** or **Street/Road Name** or **ZIP Code** or **County** or **Longitude/Latitude**. You may then zoom in or out or recenter the map. (see the file [Detailed Instructions](#)) If you do find mine(s) under land of interest to you, xxxxxxxxxxxx

Continue to Maps

MINE MAP BENCHMARKING MEETING

October 15 – 16, 2003
Louisville, Kentucky



Office of Surface Mining

Technical Innovation and
Professional Services



**Software
Hardware**

Technical

Innovation

Training



**Applied
Sciences**

Professional

**Technical
Assistance**

Services



Customers

- **State, Tribal and Federal programs that implement the Surface Mining Control and Reclamation Act (SMCRA)**
- **Other State Agencies when supporting the State SMCRA programs**
- **43 Customer Sites**
 - **States**
 - **Tribes**
 - **OSM Offices**



TIPS Service Managers

- **Primary liaison – regular meetings**
- **Identifies customer needs**
- **Formulates action plans**
- **Arranges TIPS services**
- **Coordinates activities with customers and OSM offices**



TIPS Software and Training

- **Imagery/ Remote Sensing**
- **Geographic Information System (GIS)**
- **Global Positioning Systems (GPS)**
- **Geologic Modeling**
- **Mapping / Site Design**
- **Statistical Analysis**
- **Surface and Ground Water Modeling**
- **Slope Stability Analysis**
- **Water Quality Analysis**



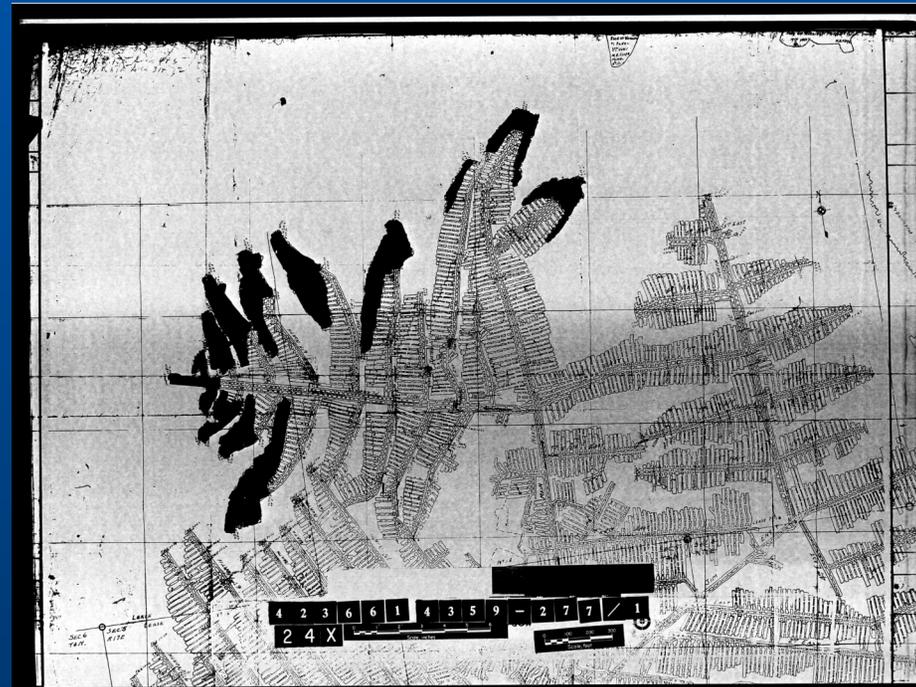
Mine Map Initiative

Technology Needs

- Cleanup and manipulate mine map images
- Georeferencing mine maps
- Moving maps to GIS
- Geologic modeling and subsidence prediction
- Hydrology and water quality
- Mine Map Verification
- Design of remedial measures

Map Cleanup and Image Manipulation

- Erdas Imagine
- Autodesk Raster Design
- ArcGIS Image Analyst



Georeferencing Mine Maps

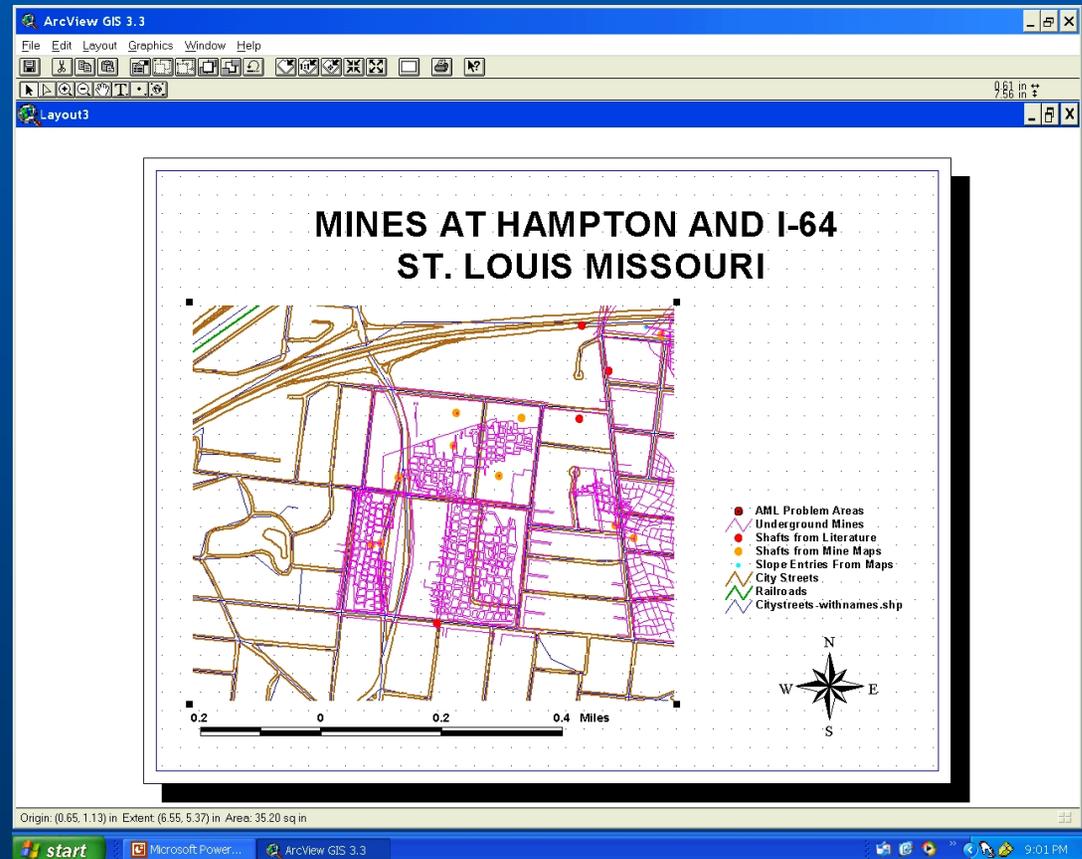
- ArcGIS
- Erdas Imagine
- AutoCAD
Map/SurvCADD
- Autodesk Raster
Design 2004





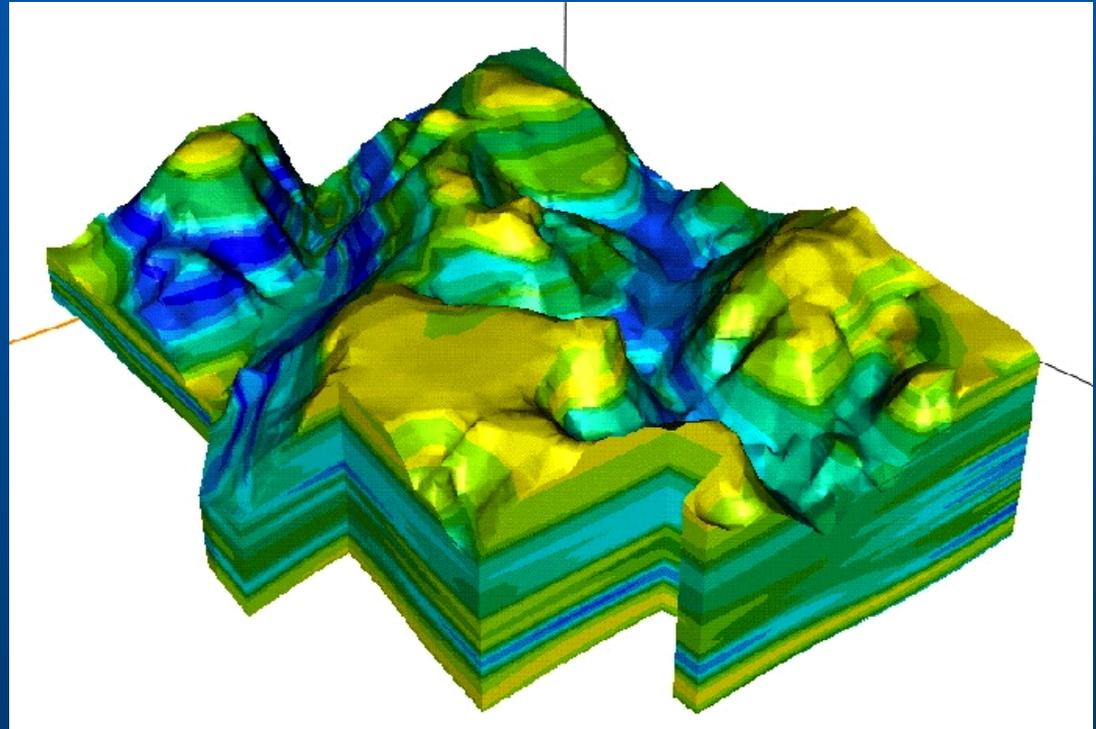
Moving Maps to GIS

- Autodesk Raster Design 2004
- ArcGIS
- ArcView 3.3



Geologic Modeling and Subsidence Prediction

- Earth Vision
- Stratifact
- Galena
- SDPS



Hydrology and Water Quality

- AMD Treat
- AQTESOLV Professional
- AquaChem
- Geochemist Workbench

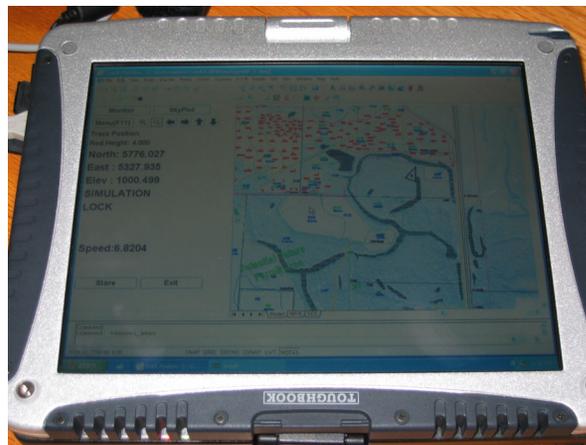


- GMS
- Ground Water Vistas



Mine Map Verification

Mobile Computing





Mobile Computing

ESRI ArcPAD

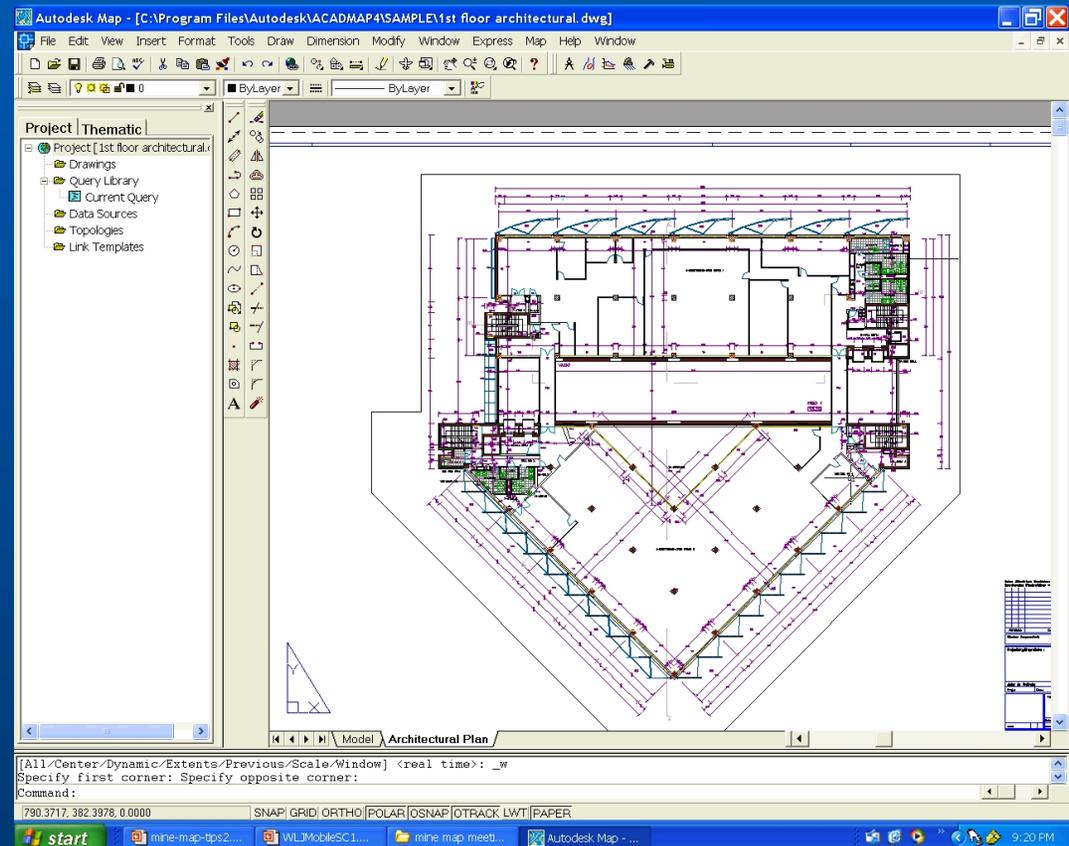
SurvCADD Tsunami

Trimble Terra Sync



Design of Remedial Measures

- Autodesk Map 2004
- SurvCADD 2004





TIPS Brochure

- **Your Roadmap to TIPS Services**
- **TIPS Contact Instructions**
- **Web and Phone Support**
- **Project Assistance**



TIPS Website

- TIPS Training URL is <http://www.tips.osmre.gov/>
- TIPS Software/Hardware Support
<http://www.tips.osmre.gov/SoftwareHardware.htm>
- TIPS Training Program
<http://www.tips.osmre.gov/TrainingProgram.htm>
- Research and Development
<http://www.tips.osmre.gov/R&D.htm>
- Technical Assistance
<http://www.tips.osmre.gov/TechAssist.htm>