CO-OP MINING COMPANY

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Office (435) 687-2450
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July 21, 2005

Coal Program
Utah Division of Oil, Gas & Mining
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801

To Whom It May Concern,

Re: <u>Application to Change existing Mining Plan, Lease Addition, Bear Canyon Mine, ACT/015/025</u>

Enclosed are four (4) digital copies and 1 hard copy of an amendment to extend the Bear Canyon Permit boundary to add 60 acres to lease U-024316, 2,196.09 acres to lease U-61049, 1,400 acres to lease U-46484, 1,108.27 acres to U-61048, and 2,740.00 acres of private property.

After we completed the amendment we received a letter from the Division outlining the proposed directory structure for electronic submittal. We are submitting this one as is as per the telephone conversation with Pam. We will be rearranging the electronic portion of the submittal to match Division guidelines and will resubmit the cd's in the format recommended by the Division.

If you have any questions, please call me at (435) 687-5238.

Thank You,

Mark Reynolds

Enclosure(s)

APPLICATION FOR COAL PERMIT PROCESSING

Permit Change New Permit Renewal Exploration Bond Release Transfer

Permittee: CO-OP MINING COMPANY

Mine: BEAR CANYON MINE **Permit Number:** ACT/015/025

Title: Lease Addition

Description, Include reason for application and timing required to implement:

To add federal leases U-46484, U-61048 & U-61049 to the permit area

Instructions: If you answer yes to any of the first eight (gray) questions, this application may require Public Notice publication.

Yes No 1. Change in the size of the Permit Area? Acres: 7,504.36 Disturbed Area: 0.0 increase decrease.
Yes No 2. Is the application submitted as a result of a Division Order? DO# _____
Yes No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
Yes No 4. Does the application include operations in hydrologic basins other than as currently approved?
Yes No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
Yes No 6. Does the application require or include public notice publication?
Yes No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
Yes No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
Yes No 9. Is the application submitted as a result of a Violation? NOV # _____
Yes No 10. Is the application submitted as a result of other laws or regulations or policies?
Explain: _____
Yes No 11. Does the application affect the surface landowner or change the post mining land use?
Yes No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
Yes No 13. Does the application require or include collection and reporting of any baseline information?
Yes No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
Yes No 15. Does the application require or include soil removal, storage or placement?
Yes No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
Yes No 17. Does the application require or include construction, modification, or removal of surface facilities?
Yes No 18. Does the application require or include water monitoring, sediment or drainage control measures?
Yes No 19. Does the application require or include certified designs, maps or calculation?
Yes No 20. Does the application require or include subsidence control or monitoring?
Yes No 21. Have reclamation costs for bonding been provided?
Yes No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
Yes No 23. Does the application affect permits issued by other agencies or permits issued to other entities?

Please attach four (4) review copies of the application. If the mine is on or adjacent to Forest Service land please submit five (5) copies, thank you. (These numbers include a copy for the Price Field Office)

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

_____ _____
Print Name Sign Name, Position, Date

Subscribed and sworn to before me this _____day of _____, 20_____

_____
Notary Public
My commission Expires: _____, 20____}
Attest: State of _____} } ss:
County of _____

For Office Use Only:	Assigned Tracking Number:	Received by Oil, Gas & Mining

APPLICATION FOR COAL PERMIT PROCESSING
Detailed Schedule Of Changes to the Mining And Reclamation Plan

Permittee: CO-OP MINING COMPANY
Mine: BEAR CANYON MINE **Permit Number:** ACT/015/025
Title: Lease addition.

Provide a detailed listing of all changes to the Mining and Reclamation Plan, which is required as a result of this proposed permit application. Individually list all maps and drawings that are added, replaced, or removed from the plan. Include changes to the table of contents, section of the plan, or other information as needed to specifically locate, identify and revise the existing Mining and Reclamation Plan. Include page, section and drawing number as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIAL TO BE CHANGED
Add	Replace	Remove	Fixed wording errors associated with reformatt on pages 1-iv, 1-8, 1-11, 1-13, 2-28, 3-2, 4-1, 4-2, 4-4, 4-11, 4-21, 4-22, 5-5, 5-9, 5-14, 5-18, 5-26, 5-35, 7-V, 7-11, 7-50, 7M-12
Add	Replace	Remove	Added federal leases on pages 1-6, 3-13, 3-28, 4-3, 4-9, 5-15, and Plates 1-1, 1-2, 1-3, 5-3, 6-1 thru 6-5, 6-10 thru 6-16, 7-4A, and 7N-2.
Add	Replace	Remove	Updated workings and projections on pages 1-11, 5-9, and Plates 5-1A and 5-1C.
Add	Replace	Remove	Updated hydrology and water monitoring on pages 5C-5, 7-54, 7M-2, 7M-8, 7M-11, 7M-14, 7M-16, 7M-16, and Plate 7-4.
Add	Replace	Remove	Updated Potential subsidence zone on Plate 5-3 and added subsidence points 51-57.
Add	Replace	Remove	Added Appendix 4G for the Air Quality Approval Order.
Add	Replace	Remove	Removed Appendix 7P and moved content to 4G.
Add	Replace	Remove	Updated Plate 3-1 vegetation map and Plate 3-2 Deer Map.
Add	Replace	Remove	Added cultural resource survey as Apendix 4F and bat survey as 3M.
Add	Replace	Remove	Added new appendices to pages 3-iv, and 4-iv.
Add	Replace	Remove	Added Plate 3-3 Elk Habitat.
Add	Replace	Remove	Added Appendix 7M Attachment B for the 1991 spring inventory.
Add	Replace	Remove	On all maps showing the permit area we
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Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.	**Received by Oil, Gas & Mining**

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Permit Area

A.	T16S, R7E SLBM	Sec.	14 S1/2
		Sec.	23 E1/2, E1/2 W1/2
		Sec.	24 W1/2, W1/2 E1/2
		Sec.	25 NW1/4 NW1/4, E1/2 NW1/4, SW1/4 SW1/4, E1/2 SW1/4
		Sec.	26 NE1/4 NE1/4, NW1/4 NE1/4, N1/2 SW1/4 NE1/4 and the access/haul road and topsoil storage area as shown on Plate 2-1.
	T16S, R8E SLBM	Sec.	7 NE1/4, NE1/4
		Sec.	8 NW1/4, W1/4 E1/2, N1/2 SW ¼, SE1/4 SW1/4
		Sec.	16 All
		Sec.	17 All
		Sec.	21 E1/2 NW1/4, NE1/4, N1/2 SE1/4, SE1/4, SE1/4, E1/2 SW1/4 SE1/4, E1/2 W1/2 SW1/4 SE1/4
B.	T16S, R7E SLBM	Sec.	1 E1/2
		Sec.	10 N1/2, N1/2 S1/2, SE1/4 SW1/4, S1/2 SE1/4
		Sec.	11 All
		Sec.	12 All
		Sec.	13 ~~W1/4~~ All
		Sec.	14 NE1/4, E1/2 NW1/4
		Sec.	24 ~~E1/2 SE1/4, SE1/4 NE1/4~~ E1/2, E1/2
		Sec.	25 E1/2
	T16S, R8E SLBM	Sec.	18 SW1/4, SW1/4
		Sec.	19 S1/2 NW1/4, SW1/4, SW1/4 SE1/4, N1/2 SE1/4
		Sec.	20 S1/2 NW1/4 W1/4, N1/2 SW1/4
		Sec.	30 W1/2, W1/2 NE1/4, Nw1/4 SE1/4
C.	T16S, R7E SLBM	Sec.	25 SW1/4 NW1/4, NW1/4 SW1/4
	T16S, R8E SLBM	Sec.	6 s1/2 nw1/2, s1/2 se1/4, nw1/2 se1/4, sw1/4
		Sec.	7 W1/2, NW1/4 NE1/4, S1/2 NE1/4, SE1/4
		Sec.	8 SW1/4, SW1/4
		Sec.	18 N1/2, SE1/4, N1/2 SW1/4, SE1/4 SW1/4
D.	~~T16S, R7E SLBM~~	~~Sec.~~	~~25 E1/2~~
	T16S, R8E SLBM	~~Sec.~~	~~30 W1/2, W1/2 NE1/4, NW1/4 SE1/4~~
		Sec.	31 NE1/4 NW1/4, NW1/4 NE1/4

Note: Letter corresponds with ownership shown in Table 2-1.

C. W. Mining Co. has never forfeited a performance bond.

113.200-240 Not Applicable

113.300-350 For any violation include the date of issuance and identity of the issuing regulatory authority. A brief description of the violation alleged in the notice. The date and location of any judicial proceeding initiated concerning the violation. The current status of the proceedings and of the violation notice. The actions taken by any person identified to abate the violation.

Violation information for C. W. Mining Company is given in Appendix 1-A

R645-301-114 Right of Entry Information

114.100-300 A description of the documents upon which the legal right to enter and begin coal mining and reclamation is based.

The applicant's right to enter the lands and to conduct operations in the permit area is based on the documents listed below. (See Appendix 1-B)

1. Title or Title Insurance Policy
2. Deed or Trust Deed
3. Utah Business License
4. County Business License
5. Tax Commission License
6. Coal Leases
7. Etc.

A statement concerning the lease between C.O.P. and Co-Op to mine coal is found in Appendix 1-B. ~~This lease includes the area that Co-Op will use for the shower house proposed in 1992.~~

Claim of exemption as described in R645-301-333

No exemption claimed

115.300 Information regarding owners of nearby buildings

Waiver letters from the occupants of dwellings located within 300 feet of the coal mining operations are found in Appendix 1-F.

R645-301-116 Permit Term

116.100 Starting and termination dates and the anticipated number of acres to be affected during each phase of mining over the life of the mine.

The mine started construction in 1981 and was in production by late fall of 1981.

Termination dates anticipated for each phase of mining are nebulous at this time although a detailed estimate of production and reserves are included in the Geology Section and a projection of ~~33~~ 11 years appears realistic (from ~~199~~ 2005). The final termination date for the mining operation is expected to be ~~2012~~ 2016.

The actual surface acreage disturbed by the mine operation is identified in Table 1-4, ~~and~~ R645-301-222.300, and R645-301-240. Plate 1-1 shows the permit area and Plates 5-2 show the surface facilities and disturbed area.

R645-301-117 Insurance, Proof of Publication and Facilities or Structures Used in Common

117.100 Proof of liability insurance.

Co-Op carries public liability and property damage insurance in due force. In response to OSM's completeness statement, this policy has been increased to comply with the requirements of 30 CFR 806.14 and R645-301-117. The policy bears a rider requiring the insurer to notify OSM and DOGM if the policy is canceled. A copy of the certificate of insurance and rider is supplied to the Utah Division of Oil, Gas, and Mining (Appendix 1-C).

117.200 Proof of publication in newspapers for permit, significant revision, and permit renewal.

As required with the filing of this application with the Division of Oil, Gas, and Mining, the applicant has filed an advertisement with the Emery County Progress and Salt Lake Tribune, local newspapers with circulation in Emery & Carbon countries sufficient to cover the locality of the applicant's operations. This advertisement follows the format required under 30 CFR 786.11 9aO and R645-300-121. Proof of publication can be found with a copy of the publication in Appendix 1-D.

117.300 Facilities Shared With Other Operations

Not Applicable

Topsoil salvage depths for each unit are shown on page 13 of Appendix 2-F, and page 7 of Appendix 2-G. Soil map units are shown on Plate 2-1. Co-Op proposes to salvage topsoil in accordance with Appendix 2-F. The actual depth may vary in areas where high organic material is present at deeper or shallower depths, or where bouldery material precludes accurate salvage of the specified depths.

Topsoil ~~will be~~ was recovered during construction and relocated to the stockpile area shown on Plates 5-2F and 5-2G. A total of 8,700 cubic yards of topsoil ~~will be~~ was recovered during construction of the Blind Canyon Seam Pad, as shown in Table 5J-1. Plate 2-2E shows the details of the topsoil stockpile. The topsoil stockpile will be surrounded with a containment berm and protected as stated in R645-301-234.220. An additional volume of 2,354 cubic yards of topsoil within the stockpile area will not be disturbed, but is included in the total available volume in Table 2-8. Permeable fabric strips will be placed over this area prior to stockpiling additional topsoil in the area to preserve the location of the contact between the native topsoil and additional topsoil placed in the pile.

During construction of the Tank Seam Pad a total of 1,300 cubic yards of topsoil ~~will be~~ was recovered, as shown in Table 5K-1. Details of the topsoil stockpile are shown in Appendix 5-K

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CHAPTER 3 BIOLOGY

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~~1OPERATION AND RECLAMATION PLAN~~

~~3.1 SCOPE~~

~~This Chapter describes the action and procedures of Co-op Mining Company (Co-Op) to satisfy the requirements for underground mining operations and reclamation.~~

~~3.2 SURFACE FACILITIES - EXISTING~~

~~The mine which existed at the present site when mining began had been abandoned for over 30 years and subsequently there is no evidence of long existing facilities.~~

~~3.3 SURFACE FACILITIES - NEW~~

~~3.3.1 Site Selection and Preparation of Proposed Facilities~~

~~Plates 2-4 show the location of all surface facilities. In addition, the maps show an accurate determination of where each facility is in relation to the existing topography as well as structural fixtures such as highways and stream buffer zones.~~

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Wild Horse Ridge Vegetation

In 2001, Co-Op increased the disturbance to include access roads, portals and a conveyor corridor to access coal reserves in Wild Horse Ridge. The baseline vegetation data is described in Appendix 3-F. Sampling was performed in August of 1996. A reference area is shown on Plate 3-1, and sampling information for the reference area is included in Appendix 3-F. Production information was collected on the proposed disturbed area and reference area in August, 1999. This information will be included in Appendix 3-F.

Wild Horse Ridge Tank Seam Vegetation

The baseline data for the Wild Horse Ridge Tank Seam area is described in Appendix 3-G. Sampling was performed in August of 2001, a reference area is shown on Plate 3-1 and sampling information for the reference is included in Appendix 3-G.

C. W. Mining Company will assure that for the Tank Seam area there will be at least 1,000 plants per acre after reclamation, and that at least half of the woody plants (by number) will be comprised of Mountain Mahogany, Skunkbrush, and Vasey Big Sagebrush.

Federal lease U-61048 & U-61049

In 2004 & 2005 Mt. Nebo Scientific in cooperation with the forest sevices performed a vegitation survey of all areas on Gentry Mountain located within the permit area. The results of this study can be found on Plate 3-1.

Lease 61048 & 61049 Addition

In 2004 & 2005 Mt. Nebo Scientific compiled information gathered by the Department of Wildlife Resources for the permit area. The results of this work can be found on Plates 3-2 & 3-3 .

Listed or Proposed Endangered or Protected Species of Plants and Animals

There are no endangered or threatened species of mammals in the mine plan area, nor are there any in proximity close enough to be considered (Figure 3-1). Co-Op is committed to notify the Division in the event any T & E species were observed on the permit area, as well as any critical habitat.

Official U.S. Fish and Wildlife Service Section 7 opinions relating to the aquatic resources of Huntington and Eccles Canyon drainages have indicated that no threatened or endangered species of fish or other aquatic organisms have been found in waters upstream of the lowest 2 or 3 mi of the Price or San Rafael rivers. The organisms of Trail Creek, as presently known, are all common and widely distributed throughout streams of Utah. The aquatic organisms of Bear Creek have representatives of several taxonomic classifications that are limited to low quality environs, but none, as far as is presently known, are rare in the inter-mountain region.

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Chapter 4 Land Use and Air Quality

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R645-301-400 Land Use and Air Quality

R645-301-410 Land Use

1Co-Op mining property and adjacent area is currently used for grazing, recreation and coal mining. Plates ~~2-2~~ 1-2 and ~~2-3~~ 1-3 coupled with Table ~~2-1~~ 1-3 show the fee ownership and leasehold interests adjacent to the permit boundary and the fee ownership of contiguous areas. This information provides a guide to the land uses of the various parcels.

1**Surface Land Status/Mine Plan**

The land within the Bear Canyon Mine permit area fall under the jurisdiction of the State of Utah, U.S Forest Service, Emery County, and private surface owners.

County zoning ordinances classify the permit area as MG-1 (Mining and Grazing) and CE-1 (Critical Environment) as shown on Plate ~~2-2~~ 1-2. Site Plan approval has been issued by Emery County to approve mining.

Ownership

Plates ~~2-2~~ 1-2 and ~~2-3~~ 1-3 show the ownership of property within and contiguous to the permit boundaries. Ownership of land parcels within the permit boundaries are designated by capital letters. See Chapter ~~2~~ 1, Table ~~2-1~~ 1-3, for letter designation.

Surface Managing Authorities

Plate ~~2-2~~ 1-2 shows the surface ownership for each parcel within the permit boundaries. The local, state, and federal managing authorities are Emery County, State of Utah, Bureau of Land Management and the U.S. Forest Service.

1**Utility Corridors and Other Right-of-Ways**

Co-Op has been granted a mine access right-of-way in Section 26 along the Paved County Road accessing Bear Canyon. Utility corridors, such as power lines, telephone lines and water pipes, are shown on Plates ~~2-4~~ 5-2. All coal mining and reclamation operations will be conducted in a manner which minimizes damage, destruction, or disruption of services provided by oil, gas, and water wells; oil, gas, and coal slurry pipelines, railroads, electric and telephone lines; and water sewage lines which pass over, under, or through the permit area.

No oil, gas, or water wells, pipelines, railroads, electric and telephone lines, or water and sewer lines exist within the permit area except those associated with the mining operation, as described in ~~chapter 3~~ R645-301-521 and shown on plates ~~2-4A~~ 5-2A thru ~~2-4G~~ 5-2G.

Special use Permits and Leases

Co-Op leases land owned and leased by COP Development Company. Special use permits and information are shown in ~~Chapter 2~~ 1.

Mineral Ownership/Mine Plan Area

Other than coal, no minerals of value have been mined within the lease and permit area. No other mineral resources are known to be present in commercial quantities however there is potential for discoveries.

Coal Ownership and Mines (Permit Area and Contiguous Areas)

Coal ownership and mines in the permit area and contiguous areas are shown on Plate ~~2-3~~ 1-3 and listed with addresses in ~~Section 2.2~~ R645-34-112.330, Table ~~2-1~~ 1-1.

Coal Leases

The following coal leases are held by Co-Op adjacent to the permit area. For the locations of these coal leases, please refer to Plate 2-3.

Trail Canyon Permit Area
Bear Canyon Permit Area
BLM U-024316
BLM U-024318
BLM U-46484
BLM U-020668
BLM U-38727
BLM U-61048
BLM U-61049

Mineral Leases

BLM U-024316	(See Appendix ~~2-F~~ 1-E).
BLM U-024318	(See Appendix ~~2-F~~ 1-E).
BLM U-46484	
BLM U-020668	
BLM U-38727	
BLM U-61048	
BLM U-61049	

Oil and Gas Ownership and Leases

Co-Op represents no interest in oil or gas leases in the permit area. Federal Oil and Gas Leases U-38968 and U-58422 lie within the same area.

R645-301-411 Environmental Description

HISTORICAL AND CULTURAL RESOURCES

SCOPE

The project area is situated in the Wasatch Plateau mining area, approximately 15 miles west-southwest of Huntington, Utah USGS 7.5 Minute topographic quads of the project area include those and adjacent areas.

Surface within the large intensive survey area include privately owned, state, and Bureau of Land Management (BLM) administered lands, and U.S. Forest Service.

Environment and Locality

The Co-op Mining Company (Co-Op) project area is located on the east flank of the Wasatch Mountain Range. The highland locations are situated above the 8,000-ft. elevation adjacent to the and within Manti-LaSal National Forest while the larger mine facility in Bear Canyon lies at the base of the Wasatch Plateau between the 6,800 and 8,000-ft. elevations.

Grazing. Private land owned by COP Development Company in and contiguous to the Permit area is presently used for grazing. Grazing occurs on Leases U-024316, U-020668 ~~and~~ , U-38727, U-61048, and U61049 is managed by the U.S. Forest Service.

Recreation. Recreational use of the area affected by mining operations consists primarily of hunting and camping. Heavy hunting of mule deer occurs on the area. Camping frequently occurs on land adjacent to the property. The property owned by C.O.P. Development Company in and adjacent to the permit is currently leased to Sportsman's, Inc. as part of a Private Hunting Unit (PHU). This PHU includes a hunting cabin located adjacent to the Wild Horse Ridge within the permit. Recreational access to this facility is provided by the Bear Canyon Haul Road, the Wild Horse Ridge #3 and #4 Mine access roads.

Forestry. Merchantable timber is found within the mine permit area primarily on the flanks and top of McCadden Ridge within Lease U-024316, although much of the area is covered by pinyon pine and juniper. Limited resources also exist in the bottom of Bear Canyon, primarily within the Right Fork area.

Mining. The type and extent of mining activities are discussed in detail in Chapter 5.

However, in the event that C. W. Mining is in a position to permit new facilities on disturbed ground, it has committed to a thorough Paleo-Archo Survey prior to any new disturbances. Also, should any evidence of Pale-Archo finds be discovered in the course of present construction, the site will be roped off and construction halted until the Historical Division is contacted. However, a survey was conducted the summer of 1984 and 1990 for those areas which may be adversely impacted by subsidence. This information was submitted as Appendix 4-A. Appendix 4-B contains the results of a survey of the Wild Horse Ridge Area which was conducted in 1982. Appendix 4-C contains the results of a survey of the Wild Horse Ridge Tank Seam Area conducted in 2001. Appendix 4F contains the results of a 2004 cultural resource survey of the Wild horse Ridge subsidence area.

At the request of the U.S. Forest, an additional thorough literature search will be conducted for any cultural resources within those areas that may be adversely impacted by subsidence. Co-Op Mining Company commits to conducting this literature search prior to any retreat mining within the Wild Horse Ridge area.

Application of the National Register Criteria of Eligibility, as defined under 36 CFR 60.6, indicates that there is one site within the permit area which would be considered a candidate. This is the Bear Creek Rock Shelter (Site 42 EM 1572).

411.141Cultural and Historic Resources Maps

These maps are located inside the reports on the specific areas.

Regrading and Reseeding. Erosion that develops in completed areas will be minimized by repeated grading and seeding.

Success Monitoring and Extended Responsibility Period. Vegetation and water will be monitored during the applicable period of liability to determine success of abandonment reclamation. A determination of revegetation success will then be made.

412.120 N/A

412.130 Alternative Post-Mining Land Use

No proposed post-mining land use is different from the pre-mining land use.

412.140 Considerations of Surface Owners

Consideration has been given to make all of the proposed land use consistent with owner plan and applicable Utah and local land use plans. Additionally correspondence will continue between C. W. Mining Company and the land owners to assure proposed post mining land use will be consistent with their land use plans. Copies of this correspondence will be included in Appendix 4-C.

412.200 Land Owners Comments

This is included in Appendix 4-C.

412.300 Suitability and Compatiblity

Plans for final fills and surface regarding is discussed in Chapter 5.

R645-301-420 Air Quality

R645-301-421 Compliance with the Clean Air Act

Coal mining and reclamation operations are conducted in compliance with the Clean Air Act and the Utah State Department of Health Air Conservation Regulations as outlined in the Air Quality Approval Order found in Appendix ~~4-D~~ 4-G.

R645-301-422 Coordination and Compliance with Utah Bureau of Air Quality

C. W. Mining Company is operating under Approval Order # DAQE-145-02 (Appendix ~~4-D~~ 4-G) issued by the State of Utah Department of Environmental Quality Division of Air Quality. Additionally C. W. Mining Company is regularly inspected by representative of the Division of Air Quality to assure compliance with the Approval Order and the Clean Air Act and the Utah State Department of Health Air Conservation Regulations .

R645-301-423 Air Pollution Control Plan

C. W. Mining Company will control air pollution by watering roads, drop points, and storage piles as outlined in Approval Order # DAQE-145-02 found in Appendix ~~4-D~~ 4-G.

The location of all buildings, surface and sub-surface man made features, public roads, waste piles, sediment ponds, and water impoundments are shown on Plates 5-2.

521.130 Landownership and Right of Entry and Public Interest Maps

521.131 Land Ownership Maps

All boundaries of lands and names of present owners of record of those land, both surface and subsurface are shown on Plate1-2 and Plate 1-3.

521.132 Boundaries of Land C.W. Mining Has Right of Entry To.

These boundaries are shown on Plate 1-2 and Plate 1-3.

521.133 Protection of Public Interest

C. W. Mining currently has no operations within 100 feet of public land or a public road.

521.140 Mine Maps and Permit Area Maps

521.141 Disturbed Boundary and Timing Of Mining

The boundary of all disturbed and proposed disturbed areas are shown on Plates 5-2. The areas to be mined and the sequence and timing of the mining are shown on Plate 5-1A (Blind Canyon Seam), Plate 5-1B (Hiawatha Seam), and Plate 5-1C (Tank Seam). Plates 5-2 also shown the changes to all facilities and features that have been or will be made. The boundary showing all areas that may be affected by mining is shown on Plate ~~2~~1-1 (Permit Boundary).

R645-301-522 Coal Recovery

It is in the interest of C. W. Mining Company to maximize the recovery of coal resources. A large portion of C. W. Mining's coal resources are contained in Federal leases. A major condition of each lease agreement is maximum recovery of resources. When accessible, mine workings in each lease are inspected on a regular basis by the Bureau of Land Management personnel experienced in underground coal mining methods. Justification for not recovering coal deposits that may be detrimentally affected in terms of future recovery by the proposed operations include the following.

A. Seams that are too thin to be economically minable given existing or reasonably foreseeable technology.

B. Coal seems separated by insufficient rock intervals to allow safe mining above or below worked out areas.

C. Seems that are relatively thick but not extensive, and isolated by thin coal which would make development cost prohibitive.

There are four main seams in the Bear Canyon Property, the Tank Seam, the Bear Canyon Seam, Blind Canyon Seam, and Hiawatha Seam. ~~There are no plans to mine the upper Bear Canyon seam~~ There are no plans to mine both seams due to the close proximity of the Bear Canyon seam to the Blind Canyon Seam (<30 feet interburden). There are no plans to mine the Hiawatha Seam in Wild Horse Ridge due to the thinning of the seam. Mining plan, sequence and projected development for the Bear Canyon, Hiawatha, and Tank seams are shown on Plates 5-1A, 5-1B and 5-1C respectively. Geology information is discussed in Chapter 6.

Equipment Selection

Co-Op will utilize the equipment described in the following list for its mining operation and will acquire any additional equipment as required to maintain a sound mining operation.

Surface Equipment
- vibrating screens
- crushers
- conveyors
- front end loaders
- road grader
- crawler tractor
- fork lift

Recovery Rate

The recoverable coal reserves were estimated by multiplying the in-place reserve by a recovery factor of 70 pct.

The operation will produce 750,000 to 2,000,000 tons of raw coal per year with 2 to 4 miner sections working ~~240~~ 360 days. This is 3,000+ to 8,000+ tons per day with 2 to 4 production shifts operating. The rate of production (considering a lower rate during the initial buildup years plus the tonnage still to be mined in the area of old workings) will make the projected mine life approx 29 years.

Table 5-1 Coal Reserves - Bear Canyon Mine

Reserve Area	Seam	Coal Reserves (tons) In-Place	Coal Reserves (tons) Recoverable
Federal Lease			
(U-61048)	Tank	0	0
	Blind Canyon	0	0
	Hiawatha	7,540,784	3,770,392
	SUBTOTAL	7,540,784	3,770,392
(U-61049)	Tank	7,132,755	3,566,378
	Blind Canyon	0	0
	Hiawatha	17,253,863	8,626,931
	SUBTOTAL	24,386,618	12,193,309
(U-024318)	Blind Canyon*	65,363	12,600
	Hiawatha	0	0
	SUBTOTAL	65,363	12,600
(U-024316)	Tank	694,500	347,250
	Blind Canyon	Unknown	Unknown
	Hiawatha	Unknown	Unknown
	SUBTOTAL	694,500	347,250
(U-020668)	Tank	448,312	224,156
	Blind Canyon	3,185,699	1,592,850
	SUBTOTAL	3,634,011	1,817,005
(U-38727)	Tank	4,555,325	2,227,662
	Blind Canyon	3,558,827	1,592,850
	SUBTOTAL	8,114,152	4,057,075
Fee Land	Tank	7,304,476	3,652,238
	Blind Canyon	9,212,699	4,606,350
	Hiawatha	2,568,465	1,284,232
	SUBTOTAL	19,085,640	9,542,820
Total Area	Tank	13,002,613	6,501,306
	Blind Canyon	16,022,588	7,991,213
	Hiawatha	2,568,465	1,284,232
TOTAL		31,593,666	15,776,751

Protection of Natural Surface Structures & Streams

C. W. Mining's commitment to maintain a min of 200 ft barrier pillars to outcrops where required by lease stipulations will minimize the possibility of escarpment failure and resulting detrimental impacts to down stream water quality or nesting raptor. Submains under the escarpment area in Bear Canyon will be left unless otherwise approved, no retreat mining will take place under the escarpment areas, which are outside of the potential subsidence zones shown on Plate 5-3. The only stream channel which lies over the minable portion of the permit area is Bear Creek, where it flows through Federal Lease U-024316. See Appendix 5-C for an explanation of the protection zone delineation. Adequate barrier zones will be left to protect adjacent stream channels, such as Bear Creek. Downstream channels are protected from disturbed area runoff contamination by utilization of sediment ponds. Temporary sediment controls i.e.; silt fences, straw bail dikes, etc. will be installed and vegetation will be reestablished as required in the event of impacts by escarpment failure.

The material will then be returned underground and either crushed prior to transportation to use as underground road base material, or placed underground in dry areas in accordance with MSHA regulations. Samples will be taken during future development in accordance with R645-301-623.100.

Roof and rock materials developed underground during mining and related tunneling activities will be placed underground. When relocation of these materials is required underground, they will be placed in "dry" areas where there are no active seeps, sumps or drippers.

Bear Canyon #3 and #4 Mines. Coal Mine Waste such as separated waste rock which is generated from the Wild Horse Ridge operation and can not be used as described above will be hauled to Hiawatha (C1/007/011) and placed in ~~Slurry Pond 5A~~ Refuse pile 1 (MSHA ID# 1211-UT-09-~~00098~~ 02157-04). All material placement will comply with the requirements of the Hiawatha Coal Company's Coal Mining and Reclamation Plan, Section R645-301-528.

Prior to being shipped to the Hiawatha Mine, waste material will be tested for acid and toxic properties in accordance with Table 5O-1. Any material found having acid and toxic properties will be disposed of in the Hiawatha ~~Slurry Pond 5A~~ Refuse pile 1 in accordance with the Hiawatha MRP requirements for acid- and/or toxic-forming material. For sediment control, runoff from any material placed in the temporary storage area reports to and is contained in sediment pond "A".

R645-301-540 Reclamation Plan

R645-301-541 General

541.100 Reclamation of All Areas

Upon completion of mining on the permit area, C.W. Mining will reclaim all disturbed surface areas as diligently and rapidly as possible, to restore the property to pre-mining and/or alternative post-mining uses. All reclaimed areas will be maintained during the liability period for at least 10 years.

The initial step in the reclamation plan is to seal all large-diameter openings by backfilling these openings with non-combustible material (earth & small rock), adjacent to the portals. The seals will be designed such that mine drainage, if any, will not enter surface water bodies. For a more detailed description of the sealing of openings, see R645-301-529, Sealing of mine Openings, Drill Holes, Wells, etc.

The next step in reclamation would be the removal of all surface structures, equipment and road blacktop. Once this has been accomplished, all solid waste generated in the abandonment operation will be collected and disposed of in an approved manner. Additional information concerning this aspect of the reclamation plan is present in R645-301-541.300 (Surface Structures), and R645-301-542.600 (Roads).

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Chapter 7 Hydrology

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Assuming dry to increasing saturation with depth of these sandstone lenses and an average 825 ft thickness for the Blackhawk and, assuming relatively impervious, remaining, intervening silt to mudstone layers, a storage coefficient of 0.10 is assumed for the Blackhawk. This results in a storage of roughly 55,000 acre-ft within the Blackhawk formation in the permit area. The initial interception of groundwater, expressed as roof seeps, by the mine workings was approximately 3-½ acre ft/yr.

In 1989, a significant amount of water was encountered in the 1st North Section of the #1 Mine Blind Canyon Seam, expressed as roof drips and flowing from roof fractures. Mining eventually encountered the apparent source of this water, a significant channel sandstone, which traverses East-West along the North end of the #1 Mine. The exact dimensions and configuration of this channel is unknown. Isotopic dating of the water in this aquifer has indicated the water to be approximately 1,000 years old. It is anticipated that Co-Op will eventually dewater this aquifer. Surface and groundwater monitoring has indicated no hydraulic connection between this aquifer and any springs in the permit area. To date, no impacts as a result of this dewatering have been observed in any of the springs within the permit area. Additional discussion on this channel is given in Appendix 7-J.

Isotopic dating of Big Bear Springs, as well as chemical analysis, has indicated that the spring is not hydrologically to the mine water or the channel aquifer. Monitoring of Big Bear Springs, as well as Birch Spring and the other springs within the permit area will continue in order to ensure that no impacts due to mining occur. A description of the isotopic and chemical data of the mine water and springs is shown in Appendix 7-J. In 1998, surface wells SDH-2 and

Springs below the mine will be sampled to determine discharge and water quality parameters and their possible variation with time. These springs include SBC-14, Big Bear Springs, COP Development Springs, and Birch Springs (Plate 7-4). Periodic checks will be made of the mine area to determine any impact not currently expressed at the surface. This data will be used to estimate seasonal fluctuations, aquifer recharge and consistent long-term changes and to ensure that no impacts occur. Springs above the mine will be monitored for field parameters, since the potential for impact to these springs is quantity rather than quality.

Groundwater monitoring will follow the ground water sampling guidelines as shown in Table 7-12 using the water quality parameter list in Table 7-13. These tables follow the recommendations presented in Appendix 7-J. New significant occurrences within the present permit area will be promptly included in the sampling program, as specified by state requirements. Operational ground water monitoring will continue through reclamation to Bond Release.

The sampling matrix for each of the existing monitoring stations during the operational phase of mining is included in Table 7-14. No baseline data is available for SBC-17, but will be collected in 2000 and 2001, prior to mining occurring within the vicinity of this spring. Baseline samples were collected for SBC-14, SBC-15, SBC-16, MW-114 and MW-117 in 2001.

Temporary Drill Hole Seals. Within 30 days of completion, drill holes utilized for groundwater monitoring will be sealed in a nonpermanent fashion by installing PVC surface casing with a

Table 7-15 Past and existing monitoring sites

Site ID	Description	Status
Springs		
SBC-1	Under Ground Seep[1]	Dried up early 1988, and monitoring was discontinued.
SBC-2	Portal Well[2]	Dry from 1987. Caved in, lost (2) quarters and relocated in 1991.
SBC-3	Creek Well	Active
SBC-4	Huntington Spring	Active
SBC-5	Birch Spring	Active
SBC-6	COP Development Spring[3]	Dried up in 1987, with no flow through 2000. Monitoring discontinued in 2000.
SBC-12	Bear Creek Source (16-7-13-1)	Active
SBC-14	Right Fork Spring WHR-6	Active
SBC-15	Right Fork Spring WHR-5	Active
SBC-16	Fish Creek Spring WHR-4	Active
SBC-17	Upper Bear Spring 16-7-24-4	Active
SMH-1	MH Left Fork Spring (FBC-6)	Active
SMH-2	MH Water Trough (FBC-5	Active
SMH-3	MH/Trail Ridge Spring (FBC-13)	Active
SMH-4	MH Right Fork Spring (FBC-4)	Active
SCC-2	16-8-18-5	Active
SCC-6	16-8-6-1	Active
SCC-7	16-7-1-1	Active
CK-1	Cedar Creek	Active
In-Mine Sources		
SBC-7	Sump #1	Dried up and discontinued in 2000.
SBC-8	Sump #2	Dried up and discontinued in 2000.
SBC-9	Sump #3[4 6]	Abandoned in 1999 due to retreat mining and replaced by SBC-13.
SBC-9A	Hiawatha Seam 1st North	Activated in Oct. 2002 when a borehole was drilled up to the old SBC9 site.
SBC-10	Sump #4	Flow first measured Dec. 1991. Monitoring initiated Jan. 1992. In July, 1995, retreat mining progressed passed this sump, making it inaccessible. Monitoring was discontinued in August 1995. Flows from this area have subsequently flowed through the pillared area and out of the 1st East pillared section.
SBC-11	Hiawatha Seam 1st North	Active, April of 2002 tat site was activated when water started seeping form the Bear Canyon Fault.
SBC-13	1st East Pillared Section[5]	Abandoned in April 2002 due to retreat mining and replaced by SBC-9A
Wells		
DH-1A	2nd W. Monitor Well	Abandoned in 2001 due to retreat mining.
DH-2	3rd W. Monitor Well6	Abandoned in 1999 due to retreat mining.
DH-3	1st E. Monitor Well6	Abandoned in 1993 due to retreat mining and was replaced by DH-4.
DH-4	3rd W. Bleeder Monitor Well6	Abandoned in 1999 due to retreat mining.
SDH-2	Well, Sec. 11, T16S, R7E	Active
SDH-3	Well, Sec. 10, T16S, R7E	Active
MW-114	Wild Horse Ridge Monitor Well	Active
MW-117	Gentry Mtn. Monitor Well	Active

MONITORING

Since subsidence may occur over any underground extraction, a monitoring network was installed in the summer of 1987, and has been monitored since that time. Monitoring stations are steel rebar with aluminum caps, set in concrete so weather, frost heave or wildstock/wildlife will not disturb them. Location of monitoring stations are shown on Plate 5-3.

Ten permanent subsidence monitoring points (SMS-1 thru SMS-5, Con 6, and SMS-7 thru SMS-10) are located on the mine site area. Before expansion into the Federal Lease area U-023416 the subsidence monitoring plan consisted of 3 monitoring points (SMS-1, SMS-2, and SMS-3) in the Bear Canyon Permit Area, a fourth point SMS-4 in the Trail Canyon Permit Area, and a Control Point CON-5, located outside the mining area. SMS-1, SMS-3, and SMS-4 are common to both the Trail Canyon and Bear Canyon Permits. CON-6 and SMS-7 thru SMS-10 were proposed in 1990 and established 22 September 1991. CON-5 became an additional subsidence monitoring point (redesignated SMS-5). The location of all existing and proposed points are shown on Plate 5-3.

15 additional monitoring points were installed on Federal Lease U-024316. These are shown on Plate 5-3 as points 11 through 24. 26 ~~additional~~ points ~~will be~~ were added to Wild Horse Ridge (Nos. 25 through 50) to monitor subsidence on Federal Lease U-020668 and U-38727. 7 points were added in and around lease U-61049 (Numbers 51-57)

1Spring and Seep Inventory
Co-Op Bear Canyon Mine Federal Leases

General

A total of ~~five~~ seven Federal Leases are held by Co-Op Mining Company (U-024316, U-024318, U-46484, U-38727, and U-020668, U-91048, U-61049; see Plate 2 ~~1~~-1). ~~Four~~ Six of the leases are within, or partially within the boundaries of the Manti-Lasal National Forest (U-024316, U-46484, U-38727, U-020668, U-61048, and U-91049). Federal Lease U-024318 exists to the South and West of the existing permit area. Federal leases U-024316 and U-46484 are located in and around the McCadden Hollow area (T.16S., R.7E.). U-38727 and U-020668 include the area surrounding Wild Horse Ridge (T.16S., R.7E. & R.8E.). Federal Leases U-61048 and U-61049 are located in and around the Mohrland area (T.165, R7E & R8E). A survey was conducted on Lease area U-024316 and U-024318 in 1990, and on all of the lease areas in 1991 and 1992, for springs, seeps and other occurrences of water. A survey was conducted on leases U-61048 and U-61049 in 1994, 1995, and 1997. The purpose of the inventories was to establish locations of seeps and springs within the actual lease area as well as a one-quarter mile periphery area, which could feasibly be impacted through future subsidence. The inventory was designed to not only locate, but to establish baseline data relative to both quantitative and qualitative parameters of each site where springs were observed which had greater than 2 gpm. The survey area is defined in Figure 7M-1 (1990 survey) and 7M-2 (1991 survey).

In July 1991, springs and/or seeps were also located in and around the Lease areas within the mining area of influence. There were a total of 25 seeps and/or springs that were located; 24 of these had sufficient flow to collect qualitative samples. ~~Although Co-Op has preserved the qualitative data electronically, the lab sheets for the samples cannot be found and are not available. The electronic data has been included in Attachment A for informational purposes.~~ The data has been included in Attachment B. The flow from 1 of the sampled springs was less than .5 gpm. The balance of the sites had in excess of 1 gpm. A brief description of each site and field data is shown in Table 7M-2.

1Table 7M-2. 1991 Survey

ID#	Description	Flow	pH	Cond.		Date
#1 (WHR-1)	Fish Creek	120	7.9	800		7/30/91
#2 (FC-1)	L.F. Fish Creek	2.5	7.6	500		7/31/91
#3 (RF-1)	Rt. F. Fish Creek	80	7.6	500		7/31/91
#4 (WHR-3)	Head of L.F. Fish Creek	20	8.3	1050		7/30/91
#5 (SBC-16)	West Side Fish Creek L.F.		31	8.2	600	7/30/91
#6 (WHR-7)	West Side Fish Creek L.F.		40	8.2	450	7/30/91
#7 (WHR-8)	East Side Wild Horse Ridge	5	8.1	500		7/31/91
#8 (WHR-2)	East Side Fish Creek L.F.	10	8	500		7/31/91
#9 (SBC-14)	R.F., R.F. Bear Canyon	4.7	8.1	510		8/08/91
#10 (SBC-15)	L.F., R.F. Bear Canyon	<.2	8	1450		7/31/91
#11 (MH-1)	McCadden Hallow Creek	1.5	7.9	800		7/31/91
#12 (FBC-2)	McCadden Hallow Below Fence	12	8.05	550		8/01/91
#13 (FBC-3)	South Side McCadden Hallow	1.5	8	450		8/01/91
#14 (SMH-4)	McCadden Hallow Above Fence	8.7	7.5	500		8/01/91
#15 (SMH-2)	L.F. McCadden Hallow Through	8.5	8	550		8/02/91
#16 (SMH-1)	L.F. McCadden Hallow	9.8	8.4	500		8/02/91
#17 (FBC-7)	Trail Canyon Through	2.1	8.2	700		7/30/91
#18 (FBC-8)	West Side Trail Canyon	5	7.6	450		8/07/91
#19 (FBC-9)	East Side Trail Canyon	22.4	7.6	480		8/07/91
#20	Tie Fork Creek	120	8	500		8/08/91
#21 (FBC-11)	East Side Huntington Canyon	15	8.4	300		8/08/91
#22 (FBC-10)	Trail Canyon	9	7.8	450		8/07/91
#23	Huntington Creek Seepage	2.4	7.8	2000		8/08/91
#24 (WHR-9)	Wild Horse Trough	4	8.1	450		8/08/91
#25 (SBC-12)	Head Bear Creek	7.8	8.2	2000		8/08/91

Beginning with the October 1992, samples, two years of baseline data were collected through 1993 and 1994. An additional set was collected in 1997 during the permitting process of Lease U-024316. A final pre-mining set of data will be collected in 2000 for the Wild Horse Ridge Leases.

The follow sections describe the proposed matrices for each Federal Lease separately.

U-024316

The description of U-024316 includes ~~E½, NW¼~~ E1/2 NW1/4, NE1/4 sect. 14, W¼ sect. 13, T.16S., R.7E. The total area is 400 acres.

A total of four measurable seeps and springs were located in and around the lease area. These are MH-1, FBC-2, FBC-3, and FBC-12. FBC-2, FBC-3 and FBC-12 flow out of the North Horn formation. MH-1 was found in McCadden Hollow. FBC-2 and FBC-3 were dry or not found in subsequent years. MH-1, the McCadden Hollow Creek, is a stream which is fed from the springs above it. Since the springs are to be sampled, it is proposed to measure flow only for this site. Due to the small flow of FBC-3, sampling is not proposed at this site. FBC-12 is one of the source springs for Bear Creek, located within the slide area at the head of Bear Canyon. An additional source spring, labeled 16-7-13-1, was monitored by Intermountain Power Agency, and flows out of the Bear Canyon fault in the same area. This site is proposed to be monitored as SBC-12.

Table 7.1-8 summarizes the monitoring, which is proposed for U-024316. Attachment 7M-A shows the baseline data from 1992 through 1997.

1**U-024318**

This lease includes the E¼ of the NW¼, Section 26, T.16 S., R.7 E. The total area of the lease is 80 acres. This lease area is outside of the Manti-Lasal National Forest boundaries.

The only spring near this lease is Birch Springs (SBC-5). Baseline monitoring of SBC-5 is shown in Table ~~7.1-9~~ 7-15. Possible impacts to Birch Springs are discussed in Appendix 7-J.

U-46484

This lease includes Section 10, except the SW¼SW¼, all of Section 11, and the W¼ of Section 12, T.16 S., R.7 E. The total area of the lease is 1,400 acres.

A total of nine measurable sites were located and sampled in and around U-46484. These are designated on Plate 7-4 as SMH-1, SMH-2, SMH-3, SMH-4, FBC-7, FBC-8, FBC-9, FBC-10 and FBC-11. The springs are primarily located within the North Horn and Price River formations.

This lease includes:

T.16 S., R.7 E.:	
Section 24	~~SE¼NE¼, E½SE¼~~ E1/4
Section 25	W½NE¼, NE¼NE¼, W½SE¼, SE¼SE¼, SW¼NW¼, NW¼SW¼
T.16 S., R.8 E.:	
Section 19	S½NW¼, SW¼, SW¼SE¼

The total area of this lease is ~~720~~ 740 acres.

A total of five seeps, springs or streams were located in and around this lease area. They are WHR-2, WHR-3, SBC-14, SBC-15 and SBC-16. WHR-3 is the head of Fish Creek Left Fork. WHR-2 and SBC-16 are springs near the head of Fish Creek Left Fork. SBC-15 is found in the left fork of Bear Canyon Right Fork. SBC-14 is found in the right fork of Bear Canyon Right Fork. WHR-2, WHR-3 and SBC-16 all originate from the North Horn formation. SBC-16 originates in a watering pond on Wild Horse Ridge.

Attachment 7M-A contains the baseline data and will be updated as new baseline samples are taken.

U-61048

This lease includes

T165.,R.7E,:

Section 1	E1/2. SE1/4, SE1/4 NE1/4, S1/2 NE1/4, NE1/4
Section 12	E1/2 NE1/4

T.165, R.8E

Section 6	S1/2 NW1/4, S1/2 SE1/4, NW1/4 SE1/4, SW1/4
Section 7	NW1/4, S1/2 NE1/4, NW1/4, NE1/4, SE1/4
Section 8	SW1/4, SW1/4

Area=1100 Arches

A total of 4 seeps or spring are located in and around the lease area. They are SCC-2, SCC-5, SCC-6, and SCC-7. All sites originate in the North Horn formation. SCC-2 and SCC-5 are in Chris Otteson Hollow. SCC-6 and SCC-7 are at the head of Cedar Creek.

U-61049

This lease includes

T165, R7E,:

Section 1	W1/2 SE1/4, SW1/4 NE1/4, S1/2 NW1/4, NE1/4
Section 12	W1/2 NE1/4, E1/2 W1/2, SE1/4
Section 13	E1/2, E1/2, W1/2

T165, R8E,:

Section 7	SW1/2
Section 18	All
Section 19	S1/2 NE1/4, N1/2 SE1/4
Section 20	S1/2 NW1/4, N1/2 SW1/4

Area= 2200 Achres

A total of 3Wells and 14 seeps and springs are located in and around this lease area. They are MW-14, MW-16, MW-17, SCC-1, SCC-2, SBC-15, SBC-16, SBC-17, SBC-18, SBC-19, 16-8-18-1, 16-8-18-2, 16-8-18-4, 16-8-18-10, SBC-12, 16-7-13-1, 16-8-7-3. All sites are located in the North Horn except 16-7-13-1 which is located in the Price River Formation, and SBC-17 which is located in the Black Hawk Formation. MW-114 is on Wild Horse Ridge. MW-116 is between Wild Horse Ridge and Long Point. MW-117 is in McCadden Hollow. SCC-1 and SCC-2 are at Long point. SBC-18 and SBC-19 are above Fish Creek. SBC-15, SBC-16, and SBC-17 are on Wild Horse Ridge. 16-8-18-1, 16-8-18-2, 16-8-18-4, and 16-8-18-10 are above Wild Horse Ridge. SBC-12 and 16-7-13-1 are at the head of Bear Canyon. 16-8-7-3 is above Cedar Creek.

Attachment 7M-B

1991 Spring and Seep Inventory

SPRING AND SEEP INVENTORY

CO-OP BEAR CANYON MINE FEDERAL LEASE

SCOPE

An inventory was conducted on the Co-Op Mine Lease areas during June, 1990. The purpose of the inventory was to establish locations of seeps and springs within the actual permit area as well as a one-half mile periphery area which could feasibly be impacted through future subsidence. The inventory was designed to not only locate, but to establish baseline data relative to both quantitative and qualitative parameters of each site where springs were observed which had greater than 2 gpm. The area in question is defined on Figure 1.

METHODOLOGY

June 18, 1990, an aerial survey reconnaissance of the permit area was conducted by 3 staff members from E.I.S.. The purpose of the reconnaissance was to locate evidence of surface water through actual observation as well as suspect areas of moisture which would be indicated by a lushness of vegetation and/or indicator species such as willow, or cottonwood trees. An aerial survey was beneficial also in establishing a plan to contour ground search the area due to the extreme roughness of the terrain and limited access by any means other than foot.

With the information secured from the aerial survey, the U.S.F.S. was contacted and a search of their files was conducted to locate all existing water rights within the survey area. A copy of the rights are attached as Table 2. The location of all existing water rights were plotted on Figure 1 and correlated against the observation from the aerial survey. These water rights which fell within the area of potential influence were then confirmed with actual ground sightings. The results of the ground observations are recorded on Table 1 with photographs in Appendix #1.

The final phase was to conduct a ground survey of the entire area of potential influence. The method involved a 100% survey of all areas which could theoretically be impacted through mining activities; then to walk all areas within the area of influence at approximately a 200' interval (where accessible) with particular emphasis on all draws and drainage areas. This was accomplished by utilizing a four man team. Access to the ridge was gained by the road up Mohrland. then across Gentry Mt. to McCadden Hollow, then, a jeep trail down the main ridge separating Bear and Trail Canyons. Three men would be let out along the ridge, then contour search the side hills and canyon bottoms to the lower road where they would be picked up. Due to extreme roughness of the terrain and the time involved in transport, an normal working day was limited to approximately 6 hours. Each man carried with him, 2 sets of sample bottles, a thermometer, Ph and Conductivity meters, and the means to determine flow through time-volume materials. When a spring or seep was observed, its location was plotted on a map. If there was flow, it was measured as to volume, temperature, and Ph and Conductivity. There were no springs within the survey area (that were accessible) with flows in excess of 2 gpm's. The upper region of Bear Canyon was inaccessible and the main flow of Bear Creek originates approximately 300' below the ridge. This area is not accessible by conventional means, however, Bear Creek has been historically sampled by Co-Op Mine over the last 9 years.

CONCLUSIONS AND RESULTS

The area of potential influence in association with underground mining of the lease areas had springs and or seeps. There were a total of 14 seeps and/or springs that were located; none of these had sufficient flow to collect qualitative samples. The flow from 9 of the sampled springs was less then .5 gpm. Only 1 site had in excess of 2 gpm. These are labeled on Figure 1 as BL-8. BL-8 is associated with Water Right # 714 with a flow of 2 gpm. This spring is located at the outer edge of the area of potential influence and is the only source which has a well

defined outfall and established riparian zone. It is believed to be a permanent year-round source of water. M-4, (USFS # 142) has a flow of .25 gpm at the source but then diminishes to 0 gpm within approximately 200 ft. of channel. The absence of a well defined riparian zone leads to the assumption that this spring is of an intermittent nature and is most likely dry during the fall of the year.

All of the remaining springs and seeps had a very small area of influence with virtually no surface flow beyond 10' to 15' and no defined riparian zones other than that a minor lushness of vegetation in the immediate area of influence. There was no riparian based vegetation but simply a lushness of vegetation which was indigenous to the surrounding area. Table 1 lists each spring and seep with flow.

RECOMMENDATIONS

Only 1 spring has sufficient flow to warrant baseline monitoring. This constitutes the head water of Bear Creek BL-8. Due to the nature and location of this, it would necessitate an experienced rock climber to collect at the source, considering that the creek is sampled with 1300 to 1600 feet of the source, it would seem redundant to re-initiate baseline data in this inaccessible area.

CONCLUSIONS

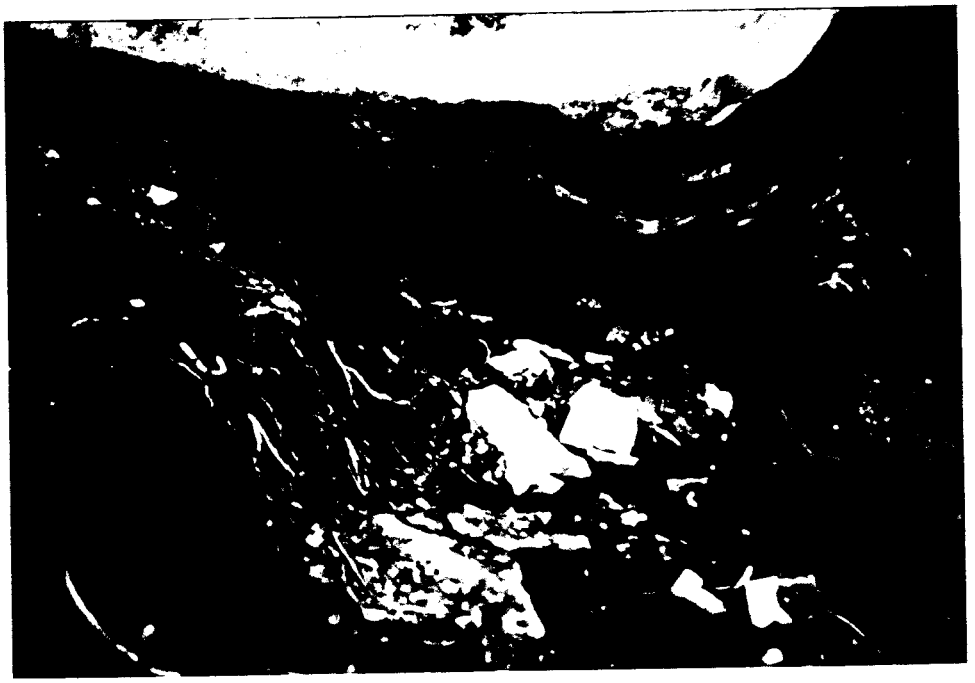
It is apparent after the survey, that surface water is conspicuously absent over the majority of the proposed lease area. In this light, all effort should be made to maintain the integrity of the existing springs. However, due to the amount of overburden and depth of the coal seam, no adverse impacts appear likely; in fact, the general consequence of the existing mining operation with its associated sediment control structures and ponds has resulted in a positive benefit to Bear Creek in eliminating considerable sediment as the creek transverses the existing permit area.

Table 1

BL-1	Spring	.3 gpm	
BL-2	Spring	.5 gpm	
BL-3	Seep	No Flow	
BL-3a	Associated seep	No Flow	
BL-4	Spring	.5 gpm	
BL-5	Spring	.5 gpm	
BL-6	Spring	.5 gpm	
BL-7	Spring	.5 gpm	
BL-8	Spring	2+ gpm	Main source
M-1a			
M-1b	Intermittant in main drainage		
M-1c			
M-2	Spring	.5 gpm	
M-3	Spring	.25 gpm	
M-4	Spring	.25 gpm	
T-1	Seep	.1 gpm	puddled

Table 2

USFS 712	Channel Area 151
USFS 714	Channel Area 142
USFS 713	Off Area of Influence



M-2

M-3

B1-1

B1-2

BL-3

BL-4

BL-5

BL-6 BL-7

SPRING AND SEEP INVENTORY

CO-OP MINING CO. FEDERAL LEASES

AUGUST, 1991

Prepared by:

Environmental Industrial Services

P.O. Box 358

Elmo, Utah

SPRING AND SEEP INVENTORY

CO-OP MINING FEDERAL LEASES

SCOPE

An inventory was conducted on the Bear Canyon Mine Lease area during July and August, 1991. The purpose of the inventory was to establish locations of seeps and springs within the actual permit area as well as a one-quarter mile periphery area which could feasibly be impacted through future subsidence. The inventory was designed to not only locate, but to establish baseline data relative to both quantitative and qualitative parameters of each site where springs were observed which had flowsgreater than .2 gpm. The area in question is defined on Figure 1.

METHODOLOGY

July 28, 1991, an aerial survey reconnaissance of the permit area was conducted by 3 staff members from E.I.S.. The purpose of the reconnaissance was to locate evidence of surface water through actual observation as well as suspect areas of moisture which would be indicated by a lushness of vegetation and/or indicator species such as willow, or cottonwood trees. An aerial survey was beneficial also in establishing a plan to contour ground search the area due to the extreme roughness of the terrain and limited access by any means other than foot.

With the information secured from the aerial survey, the U.S.F.S. was contacted and a search of their files was conducted to locate all existing water rights within the survey area. A copy of the rights are attached as Table 2. The location of all existing water rights were plotted on Figure 1 and correlated against the observation from the aerial survey. These water rights which fell within the area of potential influence were then confirmed with actual ground sightings. The results of the ground observations are recorded on Table 1 with lab analysis in Appendix #1.

The final phase was to conduct a ground survey of the entire area of potential influence. The method involved a 100% survey of all areas which could theoretically be impacted through mining activities; then to walk all areas within the area of influence at approximately a 200' interval (where accessible) with particular emphasis on all draws and drainage areas. This was accomplished by utilizing a four to six man team. Access to the ridge was gained by the road up Cedar Creek from Mohrland, then across Gentry Mt. to the Lease area, then along jeep trails down the main ridges. Three to five men would be let out along the ridge, then contour search the side hills and canyon bottoms to the lower road where they would be picked up. Due to extreme roughness of the terrain and the time involved in transport, an normal working day was limited to approximately 6 hours. Each man carried with him, 2 sets of sample bottles, a thermometer, Ph and Conductivity meters, and the means to determine flow through

time-volume materials. When a spring or seep was observed, its location was plotted on a map. If there was flow, it was measured as to volume, temperature, and Ph and Conductivity.

CONCLUSIONS AND RESULTS

The area of potential influence in association with underground mining of the lease areas had springs and or seeps. There were a total of 25 seeps and/or springs that were located; 24 of these had sufficient flow to collect qualitative samples. The flow from 1 of the sampled springs was less than .5 gpms. The balance of the sites had in excess of 1 gpm. A brief description of each site and field data is as follows:

Table 1

Identification #		Flow	PH	Cond.	Date
# 1	Fish Creek	120	7.9	800	7/30/91
# 2	L.F. Fish Creek	2.5	7.6	500	7/31/91
# 3	Rt. F. Fish Creek	80	7.6	500	7/31/91
# 4	Head of L.F. Fish Creek	20	8.3	1050	7/30/91
# 5	Head of L.F. Fish Creek	31	8.2	600	7/30/91
# 6	Head of L.F. Fish Creek	40	8.2	450	7/30/91
# 7	Wild Horse Ridge Pt.	5	8.1	500	7/31/91
# 8	Wild Horse Ridge Trough	10	8	500	7/31/91
# 9	RF, RF Bear	4.7	8.1	510	8/08/91
#10	LF, RF Bear	>.2	8	1450	7/31/91
#11	McCadden Hollow	1.5	7.9	800	7/31/91
#12	McCadden Hollow	12	8.05	550	8/01/91
#13	McCadden Hollow	1.5	8	450	8/01/91
#14	McCadden Hollow Trough	8.7	7.5	500	8/01/91
#15	McCadden Hollow Trough	8.5	8	550	8/02/91
#16	(7 locations)	9.8	8.4	500	8/02/91
#17	Spring (Fish Creek)	2.1	8.2	700	7/30/91
#18	Tie Fork Above Fence	5	7.6	450	8/07/91
#19	Tie Fork Below Fence	22.4	7.6	480	8/07/91
#20	Main Creek Tie Fork	120	8	500	8/08/91

Table 1 (Continued)

Identification #		Flow	PH	Cond.	Date
#21	Side Canyon Hunt. Creek	15	8.4	300	8/08/91
#22	Head of Trail Creek	9	7.8	450	8/07/91
#23	Huntington Canyon (Hwy)	2.4 seep area	7.8	2000	8/08/91
#24	Wild Horse Ridge (Top side canyon)	4	8.1	450	8/08/91
#25	Head of Bear Creek	7.8	8.2	2000	8/08/91

RECOMMENDATIONS:

A number of the sources located are presently being monitored or have been historically monitored. A determination by Co-Op Mining Company, the U.S. Forest Service, Division of Oil, Gas & Mining and other concerned agencies should make a determination as to when and what new sources should be incorporated into the monitoring plan.

CONCLUSIONS:

It is apparent after the survey, that surface water is widely dispersed over the majority of the proposed lease area. In this light, all effort should be made to maintain the integrity of the existing springs. However, due to the amount of overburden and depth of the coal seam, no adverse impacts appear likely; in fact, the general consequence of the existing mining operation with its associates sediment control structures and ponds has resulted in a positive benefit to Bear Creek in eliminating considerable sediment as the creek transverses the existing permit area.

Table 2

Recorded Water Rights

Table 2 Recorded Water Rights

W U C #	Name	Amount
93-116	Utah Power & Light	11.28 acre-ft
93-129	Nevada Electric Investment Co. (NEICO)	0.85 acre-ft
93-130	U. S. Forest Service	11.28 acre-ft
93-131	Peabody Coal Company/NEICO	
93-138	Nevada Electric Investment Co.	0.85 acre-ft
93-139	U. S. Forest Service	11.28 acre-ft
93-140	Utah State Division of State Lands	4.70 acre-ft
93-141	Nevada Electric Investment Co.	0.85 acre-ft
93-142	U. S. Forest Service	11.28 acre-ft
93-143	Nevada Electric Investment Co.	
93-144	U. S. Forest Service	11.28 acre-ft
93-146	Nevada Electric Investment Co.	
93-147	U. S. Bureau of Land Management	
93-148	U. S. Bureau of Land Management	
93-149	Nevada Electric Investment Co.	
93-150	Nevada Electric Investment Co.	
93-151	U. S. Forest Service	11.28 acre-ft
93-155	U. S. Bureau of Land Management	
93-156	A. U. Mines Incorporated	
93-157	A.U. Mines Incorporated	
93-158	Intermountain Power Agency	
93-165	U. S. Bureau of Land Management	
93-166	U. S. Forest Service	
93-188	U. S. Forest Service	11.28 acre-ft
93-190	U. S. Forest Service	11.28 acre-ft
93-192	U. S. Forest Service	1.47 acre-ft
93-193	U. S. Forest Service	1.47 acre-ft
93-195	U. S. Forest Service	11.28 acre-ft
93-196	Hiatt, Marena Madden, et al	0.24 acre-ft
93-199	Utah Power & Light	
93-202	U. S. Bureau of Land Management	
93-203	McKinnon, Malcolm N.	
93-210	McKinnon, Malcolm N.	
93-214	Utah Power & Light	
93-217	Utah Power & Light	
93-219	Huntington Cleveland Irrigation Co.	150.00 cfs
93-220	Huntington Cleveland Irrigation Co.	150.00 cfs
93-253	Huntington Cleveland Irrigation Co.	150.00 cfs
93-254	Huntington Cleveland Irrigation Co.	150.00 cfs
93-259	U. S. Forest Service	11.28 acre-ft
93-260	Hiatt, Marena Madden, et al	0.24 acre-ft
93-303	Huntington Cleveland Irrigation Co.	
93-304	Huntington Cleveland Irrigation Co.	150.00 cfs
93-309	Huntington Cleveland Irrigation Co.	150.00 cfs
93-310	Huntington Cleveland Irrigation Co.	150.00 cfs
93-390	Nevada Electric Investment Co.	
93-564	State of Utah Division of State Lands	

Table 2 Recorded Water Rights (cont)

W U C #	Name	Amount
93-928	Huntington Cleveland Irrigation Co.	
93-955	Utah Board of Water Resources (Storage in Huntington Reservoir)	
93-1063	State of Utah Board of Water Resources	
93-1067	Kingston, Charles W.	0.25 cfs
93-1115	Utah Power & Light	20.00 cfs
93-1137	Huntington Cleveland Irrigation Co.	
93-1182	Peabody Coal Co.	
93-1183	Utah Power & Light	
93-1187	U.S. Forest Service	
93-1408	U. S. Forest Service	0.97 acre-ft
93-1411	U. S. Forest Service	1.47 acre-ft
93-1427	U. S. Forest Service	
93-1428	U. S. Forest Service	
93-1429	U. S. Forest Service	11.28 acre-ft
93-1430	U. S. Forest Service	11.28 acre-ft
93-1431	U. S. Forest Service	11.28 acre-ft
93-1432	U. S. Forest Service	11.28 acre-ft
93-1433	U. S. Forest Service	11.28 acre-ft
93-1434	U. S. Forest Service	11.28 acre-ft
93-1435	U. S. Forest Service	11.28 acre-ft
93-1436	U. S. Forest Service	11.28 acre-ft
93-2193	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2194	Huntington Cleveland Irrigation Co.	77.25 cfs
93-2195	Huntington Cleveland Irrigation Co.	80.00 cfs
93-2196	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2197	Huntington Cleveland Irrigation Co.	77.25 cfs
93-2198	Huntington Cleveland Irrigation Co.	80.00 cfs
93-2199	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2200	Huntington Cleveland Irrigation Co.	77.25 cfs
93-2201	Huntington Cleveland Irrigation Co.	80.00 cfs
93-2202	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2203	Huntington Cleveland Irrigation Co.	77.25 cfs
93-2204	Huntington Cleveland Irrigation Co.	80.00 cfs
93-2205	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2206	Huntington Cleveland Irrigation Co.	77.25 cfs
93-2207	Huntington Cleveland Irrigation Co.	80.00 cfs
93-2208	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2209	Huntington Cleveland Irrigation Co.	77.25 cfs
93-2210	Huntington Cleveland Irrigation Co.	80.00 cfs
93-2220	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2221	Huntington Cleveland Irrigation Co.	77.25 cfs
93-2222	Huntington Cleveland Irrigation Co.	80.00 cfs
93-2223	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2224	Huntington Cleveland Irrigation Co	77.25 cfs
93-2225	Huntington Cleveland Irrigation Co.	80.00 cfs
93-3171	Northwest Carbon Corporation	
93-3195	State of Utah Board of Water Resources	
93-3207	U. S. Bureau of Land Management	
93-3208	U. S. Bureau of Land Management	

Table 2 Recorded Water Rights (cont)

W U C #	Name	Amount
93-3209	U. S. Bureau of Land Management	
93-3211	U. S. Bureau of Land Management	
93-3033	Northwest Carbon Corporation	
93-3657	Co-Op Mining Company	15.0 acre-ft
e1621	Utah Power & Light	
e1730	Utah Power & Light	
e2504	Castle Valley Special Service District	

Note: This table includes all water rights on file with the Utah Division of Water Rights on the following sections; Sec. 9, 10, 11, 12, 13, 14, 15, 23, 24, 25, 26, 27, 35 36, T16S R7E S.L.B.M. and Sections; 19, 20, 29, 30, 31, 32, T16S R8E S.L.B.M.

Appendix 1

Laboratory Analysis

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co-Op Coal	DATE REPORTED:	09/18/91
ID:	0830		
SITE:	Fish Creek #1 (WHL-1)	DATE RECEIVED:	08/06/91
LAB NO:	F6832	DATE COLLECTED:	07/30/91

Lab pH (s.u.).....	7.90
Lab conductivity, umhos/cm.....	817
Lab resistivity, ohm-m.....	12.2
Total dissolved solids (180), mg/l..	562
Total dissolved solids (calc), mg/l.	520
Total suspended solids, mg/l.....	20
Total alkalinity as CaC03, mg/l.....	243
Total hardness as CaC03, mg/l.....	421
Sodium absorption ratio.....	0.617
Fluoride, mg/l.....	0.24
Sulfide as H2S, mg/l.....	0.53
Nitrate, mg/l.....	<0.02
Nitrite, mg/l.....	<0.02
Ammonia, mg/l.....	0.12

	mg/l	meq/l
Bicarbonate as HC03.....	296	4.86
Carbonate as C03.....	0	0
Chloride.....	7.81	0.22
Sulfate.....	213	4.44
Calcium.....	49.7	2.48
Magnesium.....	72.3	5.94
Potassium.....	2.71	0.07
Sodium.....	29.1	1.27
Major cations.....		9.76
Major anions.....		9.52
Cation/anion difference.....		1.27 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: 0830
SITE: Fish Creek #1 (WHR-1)
LAB NO: F6832

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.3	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.11	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	0.29	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	ND	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co-Op Coal	DATE REPORTED:	09/18/91
ID:	Spring LF		
SITE:	Fish Creek #2 (FC-2)	DATE RECEIVED:	08/06/91
LAB NO:	F6833	DATE COLLECTED:	07/31/91

Lab pH (s.u.)	7.57
Lab conductivity, umhos/cm	528
Lab resistivity, ohm-m	18.9
Total dissolved solids (180), mg/l	272
Total dissolved solids (calc), mg/l	276
Total suspended solids, mg/l	9
Total alkalinity as CaC03, mg/l	273
Total hardness as CaC03, mg/l	283
Sodium absorption ratio	0.072
Fluoride, mg/l	0.20
Sulfide as H2S, mg/l	<0.1
Nitrate, mg/l	0.17
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.07

	mg/l	meq/l
Bicarbonate as HC03	333	5.46
Carbonate as C03	0	0
Chloride	2.13	0.06
Sulfate	9.05	0.19
Calcium	72.6	3.62
Magnesium	24.8	2.04
Potassium	0.33	0.01
Sodium	2.8	0.12
Major cations		5.79
Major anions		5.72
Cation/anion difference		0.62 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: Spring LF
SITE: Fish Creek #2 (FC-2)
LAB NO: F6833

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.1	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.27	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	0.05	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	ND	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co-Op Coal	DATE REPORTED:	09/18/91
ID:	Head		
SITE:	Fish Creek #3 (RF-1)	DATE RECEIVED:	08/06/91
LAB NO:	F6834	DATE COLLECTED:	07/31/91

Lab pH (s.u.).....	7.64
Lab conductivity, umhos/cm.....	472
Lab resistivity, ohm-m.....	21.2
Total dissolved solids (180), mg/l..	270
Total dissolved solids (calc), mg/l.	272
Total suspended solids, mg/l.....	10
Total alkalinity as CaC03, mg/l.....	254
Total hardness as CaC03, mg/l.....	270
Sodium absorption ratio.....	0.103
Fluoride, mg/l.....	0.20
Sulfide as H2S, mg/l.....	<0.1
Nitrate, mg/l.....	<0.02
Nitrite, mg/l.....	<0.02
Ammonia, mg/l.....	0.05

	mg/l	meq/l
Bicarbonate as HC03.....	310	5.09
Carbonate as C03.....	0	0
Chloride.....	2.23	0.06
Sulfate.....	19.3	0.4
Calcium.....	69.7	3.48
Magnesium.....	23.4	1.93
Potassium.....	0.73	0.02
Sodium.....	3.9	0.17
Major cations.....		5.59
Major anions.....		5.55
Cation/anion difference.....		0.32 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: Head
SITE: Fish Creek #3 (RF-1)
LAB NO: F6834

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.1	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.21	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	0.10	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	ND	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co-Op Coal	DATE REPORTED:	09/18/91
ID:	Left/Right		
SITE:	Fish Creek #4 (WHR-3)	DATE RECEIVED:	08/06/91
LAB NO:	F6835	DATE COLLECTED:	07/30/91

Lab pH (s.u.).....	8.29
Lab conductivity, umhos/cm.....	1100
Lab resistivity, ohm-m.....	9.12
Total dissolved solids (180), mg/l..	822
Total dissolved solids (calc), mg/l.	755
Total suspended solids, mg/l.....	100
Total alkalinity as CaC03, mg/l.....	213
Total hardness as CaC03, mg/l.....	585
Sodium absorption ratio.....	0.446
Fluoride, mg/l.....	0.33
Sulfide as H2S, mg/l.....	0.42
Nitrate, mg/l.....	<0.02
Nitrite, mg/l.....	<0.02
Ammonia, mg/l.....	0.04

	mg/l	meq/l
Bicarbonate as HC03.....	260	4.27
Carbonate as C03.....	0	0
Chloride.....	13.5	0.38
Sulfate.....	413	8.6
Calcium.....	68	3.39
Magnesium.....	101	8.3
Potassium.....	6.52	0.17
Sodium.....	24.8	1.08
Major cations.....		12.9
Major anions.....		13.2
Cation/anion difference.....		1.17 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: Left/Right
SITE: Fish Creek #4 (w HR-3)
LAB NO: F6835

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.4	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.09	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	0.55	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.01	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

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Farmington, New Mexico 87401

CLIENT:	Co-Op Coal	DATE REPORTED:	09/18/91
ID:	LF		
SITE:	Fish Creek #5 (SBC-16)	DATE RECEIVED:	08/06/91
LAB NO:	F6836	DATE COLLECTED:	07/30/91

Lab pH (s.u.).....	8.19
Lab conductivity, umhos/cm.....	605
Lab resistivity, ohm-m.....	16.5
Total dissolved solids (180), mg/l..	342
Total dissolved solids (calc), mg/l.	366
Total suspended solids, mg/l.....	85
Total alkalinity as CaC03, mg/l.....	256
Total hardness as CaC03, mg/l.....	326
Sodium absorption ratio.....	0.26
Fluoride, mg/l.....	0.26
Sulfide as H2S, mg/l.....	0.24
Nitrate, mg/l.....	<0.02
Nitrite, mg/l.....	<0.02
Ammonia, mg/l.....	0.29

	mg/l	meq/l
Bicarbonate as HC03.....	312	5.12
Carbonate as C03.....	0	0
Chloride.....	4.97	0.14
Sulfate.....	98.8	2.06
Calcium.....	43.3	2.16
Magnesium.....	53.1	4.36
Potassium.....	1.93	0.05
Sodium.....	10.8	0.47
Major cations.....		7.04
Major anions.....		7.31
Cation/anion difference.....		1.9 %

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CLIENT: Co-Op Coal
ID: LF
SITE: Fish Creek #5 (SBC-16)
LAB NO: F6836

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.7	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.16	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	0.66	<0.05
Manganese (Mn).....	0.02	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	ND	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

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CLIENT:	Co-Op Coal	DATE REPORTED:	09/18/91
ID:	Right Fork		
SITE:	Fish Creek #6 (WPR-7)	DATE RECEIVED:	08/06/91
LAB NO:	F6837	DATE COLLECTED:	07/30/91

Lab pH (s.u.).....	8.19
Lab conductivity, umhos/cm.....	434
Lab resistivity, ohm-m.....	23
Total dissolved solids (180), mg/l..	214
Total dissolved solids (calc), mg/l.	234
Total suspended solids, mg/l.....	10
Total alkalinity as CaC03, mg/l.....	205
Total hardness as CaC03, mg/l.....	224
Sodium absorption ratio.....	0.134
Fluoride, mg/l.....	0.19
Sulfide as H2S, mg/l.....	<0.1
Nitrate, mg/l.....	<0.02
Nitrite, mg/l.....	<0.02
Ammonia, mg/l.....	0.15

	mg/l	meq/l
Bicarbonate as HC03.....	250	4.1
Carbonate as C03.....	0	0
Chloride.....	2.53	0.07
Sulfate.....	28	0.58
Calcium.....	51.6	2.57
Magnesium.....	23.2	1.91
Potassium.....	0.88	0.02
Sodium.....	4.6	0.2
Major cations.....		4.7
Major anions.....		4.76
Cation/anion difference.....		0.54 %

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CLIENT: Co-Op Coal
ID: Right Fork
SITE: Fish Creek #6 (WHR-7)
LAB NO: F6837

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.1	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.18	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	0.08	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.01	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.02	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

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CLIENT:	Co-Op Coal	DATE REPORTED:	09/18/91
ID:	Right Fork		
SITE:	Fish Creek #6 (WHR-7)	DATE RECEIVED:	08/06/91
LAB NO:	F6845 Lab Split	DATE COLLECTED:	07/30/91

Lab pH (s.u.)	8.35	
Lab conductivity, umhos/cm	429	
Lab resistivity, ohm-m	23.3	
Total dissolved solids (180), mg/l	208	
Total dissolved solids (calc), mg/l	229	
Total suspended solids, mg/l	<1	
Total alkalinity as CaC03, mg/l	196	
Total hardness as CaC03, mg/l	224	
Sodium absorption ratio	0.136	
Fluoride, mg/l	0.21	
Sulfide as H2S, mg/l	0	*
Nitrate, mg/l	<0.02	
Nitrite, mg/l	<0.02	
Ammonia, mg/l	0.13	

	mg/l	meq/l
Bicarbonate as HC03	230	3.77
Carbonate as C03	4.5	0.15
Chloride	2.64	0.07
Sulfate	28.4	0.59
Calcium	50.5	2.52
Magnesium	23.9	1.97
Potassium	0.9	0.02
Sodium	4.7	0.2
Major cations		4.72
Major anions		4.59
Cation/anion difference		1.36 %

* Insufficient sample for duplicate analysis.

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CLIENT: Co-Op Coal
ID: Right Fork
SITE: Fish Creek #6 (WH-7)
LAB NO: F6845 Lab Split

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Trace metals by AA (total concentration), mg/l

	Analytical	Detection
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.1	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.19	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	0.10	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	ND	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.02	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

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CLIENT:	Co-Op Coal	DATE REPORTED:	09/18/91
ID:	1444		
SITE:	Horse Point #7 (WHR-5)	DATE RECEIVED:	08/06/91
LAB NO:	F6838	DATE COLLECTED:	07/31/91

Lab pH (s.u.).....	8.14
Lab conductivity, umhos/cm.....	518
Lab resistivity, ohm-m.....	19.3
Total dissolved solids (180), mg/l..	294
Total dissolved solids (calc), mg/l.	300
Total suspended solids, mg/l.....	4
Total alkalinity as CaC03, mg/l.....	295
Total hardness as CaC03, mg/l.....	297
Sodium absorption ratio.....	0.098
Fluoride, mg/l.....	0.20
Sulfide as H2S, mg/l.....	0.52
Nitrate, mg/l.....	<0.02
Nitrite, mg/l.....	<0.02
Ammonia, mg/l.....	0.09

	mg/l	meq/l
Bicarbonate as HC03.....	360	5.9
Carbonate as C03.....	0	0
Chloride.....	2.94	0.08
Sulfate.....	10.3	0.21
Calcium.....	83.3	4.16
Magnesium.....	21.7	1.79
Potassium.....	0.45	0.01
Sodium.....	3.9	0.17
Major cations.....		6.13
Major anions.....		6.2
Cation/anion difference.....		0.56 %

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CLIENT: Co-Op Coal
ID: 1444
SITE: Horse Point #7 (w HP-6)
LAB NO: F6838

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	1.2	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.33	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.03	<0.01
Iron (Fe).....	1.60	<0.05
Manganese (Mn).....	0.02	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	ND	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.07	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: LF Spring
SITE: Fish Creek #8 (WHR-2)
LAB NO: F6839

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Lab pH (s.u.)	8.02
Lab conductivity, umhos/cm	515
Lab resistivity, ohm-m	19.4
Total dissolved solids (180), mg/l	262
Total dissolved solids (calc), mg/l	271
Total suspended solids, mg/l	185
Total alkalinity as CaC03, mg/l	268
Total hardness as CaC03, mg/l	272
Sodium absorption ratio	0.084
Fluoride, mg/l	0.29
Sulfide as H2S, mg/l	<0.1
Nitrate, mg/l	0.28
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.08

	mg/l	meq/l
Bicarbonate as HC03	328	5.37
Carbonate as C03	0	0
Chloride	2.23	0.06
Sulfate	8.23	0.17
Calcium	76.3	3.81
Magnesium	19.8	1.63
Potassium	0.4	0.01
Sodium	3.2	0.14
Major cations		5.58
Major anions		5.62
Cation/anion difference		0.36 %

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CLIENT: Co-Op Coal
ID: LF Spring
SITE: Fish Creek #8 (WHR-2)
LAB NO: F6839

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	1.3	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.35	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	0.90	<0.05
Manganese (Mn).....	0.02	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	ND	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co - Op Coal	DATE REPORTED:	09/16/91
ID:	0945		
SITE:	Fish Creek Spring (SBC-14)	DATE RECEIVED:	08/13/91
LAB NO:	F6907	DATE COLLECTED:	08/08/91

Lab pH (s.u.).....	8.11
Lab conductivity, umhos/cm.....	533
Lab resistivity, ohm-m.....	18.8
Total dissolved solids (180), mg/L..	312
Total dissolved solids (calc), mg/L.	300
Total suspended solids, mg/L.....	10
Total alkalinity as CaC03, mg/L.....	302
Total hardness as CaC03, mg/L.....	302
Sodium absorption ratio.....	0.068
Fluoride, mg/L.....	0.18
Sulfide as H2S, mg/L.....	<0.1
Nitrate, mg/L.....	0.27
Nitrite, mg/L.....	<0.02
Ammonia, mg/L.....	0.14

	mg/L	meq/L
Bicarbonate as HC03.....	368	6.03
Carbonate as C03.....	0	0
Chloride.....	2.53	0.07
Sulfate.....	7.41	0.15
Calcium.....	83	4.14
Magnesium.....	23.1	1.9
Potassium.....	0.28	0.01
Sodium.....	2.7	0.12
Major cations.....		6.17
Major anions.....		6.28
Cation/anion difference.....		0.83 %

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2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 0945
SITE: Fish Creek Spring (SBC-14)
LAB NO: F6907

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/L

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/L

	Analytical Result:	Detection Limit:
Aluminum (Al).....	1.0	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.36	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.02	<0.01
Iron (Fe).....	1.75	<0.05
Manganese (Mn).....	0.03	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.34	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.04	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

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Farmington, New Mexico 87401

CLIENT:	Co-Op Coal	DATE REPORTED:	09/18/91
ID:	Right Fork		
SITE:	Bear Canyon #10 (SBC-15)	DATE RECEIVED:	08/06/91
LAB NO:	F6840	DATE COLLECTED:	07/31/91

Lab pH (s.u.).....	7.96
Lab conductivity, umhos/cm.....	1480
Lab resistivity, ohm-m.....	6.76
Total dissolved solids (180), mg/l..	1140
Total dissolved solids (calc), mg/l.	1110
Total suspended solids, mg/l.....	13
Total alkalinity as CaC03, mg/l.....	412
Total hardness as CaC03, mg/l.....	891
Sodium absorption ratio.....	0.551
Fluoride, mg/l.....	0.37
Sulfide as H2S, mg/l.....	<0.1
Nitrate, mg/l.....	<0.02
Nitrite, mg/l.....	<0.02
Ammonia, mg/l.....	0.07

	mg/l	meq/l
Bicarbonate as HC03.....	503	8.24
Carbonate as C03.....	0	0
Chloride.....	18.8	0.53
Sulfate.....	541	11.3
Calcium.....	114	5.68
Magnesium.....	148	12.2
Potassium.....	5.86	0.15
Sodium.....	37.8	1.64
Major cations.....		19.6
Major anions.....		20
Cation/anion difference.....		1.04 %

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CLIENT: Co-Op Coal
ID: Right Fork
SITE: Bear Canyon #10 (SBC-15)
LAB NO: F6840

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.1	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.13	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	0.10	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	ND	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

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CLIENT:	Co-Op Coal	DATE REPORTED:	09/18/91
ID:	1130		
SITE:	URF #11 (MH-1)	DATE RECEIVED:	08/06/91
LAB NO:	F6841	DATE COLLECTED:	07/31/91

Lab pH (s.u.)	7.84
Lab conductivity, umhos/cm	770
Lab resistivity, ohm-m	13
Total dissolved solids (180), mg/l	468
Total dissolved solids (calc), mg/l	474
Total suspended solids, mg/l	8
Total alkalinity as CaC03, mg/l	381
Total hardness as CaC03, mg/l	445
Sodium absorption ratio	0.285
Fluoride, mg/l	0.34
Sulfide as H2S, mg/l	<0.1
Nitrate, mg/l	<0.02
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.07

	mg/l	meq/l
Bicarbonate as HC03	464	7.61
Carbonate as C03	0	0
Chloride	15.3	0.43
Sulfate	72.8	1.52
Calcium	85.9	4.29
Magnesium	56.1	4.61
Potassium	1.53	0.04
Sodium	13.8	0.6
Major cations		9.54
Major anions		9.56
Cation/anion difference		0.12 %

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CLIENT: Co-Op Coal
ID: 1130
SITE: URF #11 (AH-1)
LAB NO: F6841

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.2	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.18	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	0.44	<0.05
Manganese (Mn).....	0.15	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	ND	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

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Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: 1045
SITE: #12 (FBC-2)
LAB NO: F6842

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 08/01/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	10.4	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.69	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.02	<0.01
Iron (Fe).....	7.60	<0.05
Manganese (Mn).....	0.26	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.01	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.03	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co-Op Coal	DATE REPORTED:	09/18/91
ID:	1045		
SITE:	#12 (FBC-2)	DATE RECEIVED:	08/06/91
LAB NO:	F6842	DATE COLLECTED:	08/01/91

Lab pH (s.u.).....	8.06
Lab conductivity, umhos/cm.....	548
Lab resistivity, ohm-m.....	18.2
Total dissolved solids (180), mg/l..	352
Total dissolved solids (calc), mg/l.	305
Total suspended solids, mg/l.....	158
Total alkalinity as CaC03, mg/l.....	311
Total hardness as CaC03, mg/l.....	305
Sodium absorption ratio.....	0.122
Fluoride, mg/l.....	0.33
Sulfide as H2S, mg/l.....	<0.1
Nitrate, mg/l.....	<0.02
Nitrite, mg/l.....	<0.02
Ammonia, mg/l.....	0.07

	mg/l	meq/l
Bicarbonate as HC03.....	379	6.22
Carbonate as C03.....	0	0
Chloride.....	2.33	0.07
Sulfate.....	5.76	0.12
Calcium.....	77.8	3.88
Magnesium.....	26.9	2.21
Potassium.....	0.89	0.02
Sodium.....	4.9	0.21
Major cations.....		6.33
Major anions.....		6.4
Cation/anion difference.....		0.58 %

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CLIENT: Co-Op Coal
ID: 1200
SITE: Spring #13 (FBC-3)
LAB NO: F6843

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 08/01/91

Lab pH (s.u.)	8.01
Lab conductivity, umhos/cm	456
Lab resistivity, ohm-m	21.9
Total dissolved solids (180), mg/l	274
Total dissolved solids (calc), mg/l	262
Total suspended solids, mg/l	47
Total alkalinity as CaC03, mg/l	252
Total hardness as CaC03, mg/l	258
Sodium absorption ratio	0.095
Fluoride, mg/l	0.20
Sulfide as H2S, mg/l	<0.1
Nitrate, mg/l	0.38
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.05

	mg/l	meq/l
Bicarbonate as HC03	307	5.04
Carbonate as C03	0	0
Chloride	2.43	0.07
Sulfate	12.3	0.26
Calcium	72.4	3.61
Magnesium	18.8	1.55
Potassium	0.84	0.02
Sodium	3.5	0.15
Major cations		5.34
Major anions		5.4
Cation/anion difference		0.53 %

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CLIENT: Co-Op Coal
ID: 1200
SITE: Spring #13 (FBC-3)
LAB NO: F6843

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 08/01/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.2	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.20	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.03	<0.01
Iron (Fe).....	0.22	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.01	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1430
SITE: # 14 (SM14-4)
LAB NO: F6908

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/01/91

Lab pH (s.u.)	7.48
Lab conductivity, umhos/cm	514
Lab resistivity, ohm-m	19.5
Total dissolved solids (180), mg/L	396
Total dissolved solids (calc), mg/L	328
Total suspended solids, mg/L	1530
Total alkalinity as CaC03, mg/L	321
Total hardness as CaC03, mg/L	326
Sodium absorption ratio	0.111
Fluoride, mg/L	0.25
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	<0.02
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.28

	mg/L	meq/L
Bicarbonate as HC03	391	6.41
Carbonate as C03	0	0
Chloride	5.27	0.15
Sulfate	8.64	0.18
Calcium	86.3	4.3
Magnesium	27	2.22
Potassium	3.4	0.09
Sodium	4.6	0.2
Major cations		6.81
Major anions		6.74
Cation/anion difference		0.51 %

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2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1430
SITE: # 14 (SMH -4)
LAB NO: F6908

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/01/91

Trace metals by AA (total concentration), mg/L

	Analytical Result:	Detection Limit:
Arsenic (As).....	0.008	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/L

	Analytical Result:	Detection Limit:
Aluminum (Al).....	6.7	<0.1
Boron (B).....	0.07	<0.01
Barium (Ba).....	0.49	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.02	<0.01
Iron (Fe).....	9.51	<0.05
Manganese (Mn).....	0.51	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.11	<0.01
Phosphorus (P).....	1.2	<0.5
Zinc (Zn).....	0.05	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1230
SITE: # 15 (5714-2)
LAB NO: F6909

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/02/91

Lab pH (s.u.)	8.03
Lab conductivity, umhos/cm	548
Lab resistivity, ohm-m	18.2
Total dissolved solids (180), mg/L	328
Total dissolved solids (calc), mg/L	315
Total suspended solids, mg/L	16
Total alkalinity as CaC03, mg/L	301
Total hardness as CaC03, mg/L	302
Sodium absorption ratio	0.145
Fluoride, mg/L	0.34
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	<0.02
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.12

	mg/L	meq/L
Bicarbonate as HC03	367	6.01
Carbonate as C03	0	0
Chloride	7.2	0.2
Sulfate	13	0.27
Calcium	81.7	4.07
Magnesium	23.9	1.96
Potassium	2.91	0.07
Sodium	5.8	0.25
Major cations		6.37
Major anions		6.48
Cation/anion difference		0.92 %

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CLIENT: Co - Op Coal
ID: 1230
SITE: # 15 (SAH-2)
LAB NO: F6909

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/02/91

Trace metals by AA (total concentration), mg/L

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/L

	Analytical Result:	Detection Limit:
Aluminum (Al).....	1.3	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.24	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	1.24	<0.05
Manganese (Mn).....	0.06	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.02	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1245
SITE: # 16 (SA A - 1)
LAB NO: F6910

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/02/91

Lab pH (s.u.)	8.36
Lab conductivity, umhos/cm	490
Lab resistivity, ohm-m	20.4
Total dissolved solids (180), mg/L	272
Total dissolved solids (calc), mg/L	269
Total suspended solids, mg/L	3
Total alkalinity as CaC03, mg/L	254
Total hardness as CaC03, mg/L	261
Sodium absorption ratio	0.137
Fluoride, mg/L	0.28
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	0.29
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.09

	mg/L	meq/L
Bicarbonate as HC03	303	4.97
Carbonate as C03	3.3	0.11
Chloride	5.27	0.15
Sulfate	15	0.31
Calcium	69.2	3.45
Magnesium	21.5	1.77
Potassium	0.61	0.02
Sodium	5.1	0.22
Major cations		5.46
Major anions		5.56
Cation/anion difference		0.89 %

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CLIENT: Co - Op Coal
ID: 1245
SITE: # 16 (SMH-1)
LAB NO: F6910

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/02/91

Trace metals by AA (total concentration), mg/L

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/L

	Analytical Result:	Detection Limit:
Aluminum (Al).....	ND	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.22	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.01	<0.01
Iron (Fe).....	0.10	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.03	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
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CLIENT: Co-Op Coal
ID: 1221
SITE: Upper Fish Creek (FBC-7)
LAB NO: F6844

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Lab pH (s.u.)	8.19
Lab conductivity, umhos/cm	708
Lab resistivity, ohm-m	14.1
Total dissolved solids (180), mg/l	440
Total dissolved solids (calc), mg/l	391
Total suspended solids, mg/l	972
Total alkalinity as CaC03, mg/l	273
Total hardness as CaC03, mg/l	368
Sodium absorption ratio	0.229
Fluoride, mg/l	0.42
Sulfide as H2S, mg/l	<0.1
Nitrate, mg/l	0.21
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.05

	mg/l	meq/l
Bicarbonate as HC03	333	5.46
Carbonate as C03	0	0
Chloride	5.07	0.14
Sulfate	96.3	2.01
Calcium	53.4	2.67
Magnesium	57.1	4.69
Potassium	5.04	0.13
Sodium	10.1	0.44
Major cations		7.93
Major anions		7.63
Cation/anion difference		1.94 %

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2506 W. Main Street
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CLIENT: Co-Op Coal
ID: 1221
SITE: Upper Fish Creek (FBC-1)
LAB NO: F6844

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	7.0	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.20	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.03	<0.01
Iron (Fe).....	7.10	<0.05
Manganese (Mn).....	0.16	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.01	<0.01
Phosphorus (P).....	0.5	<0.5
Zinc (Zn).....	0.03	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
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CLIENT: Co - Op Coal
ID: 1000
SITE: Tye Canyon 18 (FBC-6)
LAB NO: F6896

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	0.005	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	3.6	<0.1
Boron (B).....	0.04	<0.01
Barium (Ba).....	0.29	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.02	<0.01
Iron (Fe).....	4.15	<0.05
Manganese (Mn).....	0.11	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.12	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.05	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1000
SITE: Tye Canyon 18 (FBC-8)
LAB NO: F6896

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Lab pH (s.u.)	7.60
Lab conductivity, umhos/cm	440
Lab resistivity, ohm-m	22.7
Total dissolved solids (180), mg/L	250
Total dissolved solids (calc), mg/L	251
Total suspended solids, mg/L	40
Total alkalinity as CaC03, mg/L	237
Total hardness as CaC03, mg/L	231
Sodium absorption ratio	0.16
Fluoride, mg/L	0.26
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	<0.02
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.27

	mg/L	meq/L
Bicarbonate as HC03	289	4.73
Carbonate as C03	0	0
Chloride	6.18	0.17
Sulfate	11.9	0.25
Calcium	61.7	3.08
Magnesium	18.8	1.55
Potassium	4.4	0.11
Sodium	5.6	0.24
Major cations		4.98
Major anions		5.16
Cation/anion difference		1.72 %

Inter-Mountain Laboratories, Inc.

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Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1020
SITE: Tye Canyon 19 (FBC -9)
LAB NO: F6897

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.4	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.21	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.05	<0.01
Iron (Fe).....	0.76	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.11	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.03	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co - Op Coal	DATE REPORTED:	09/11/91
ID:	1020		
SITE:	Tye Canyon 19 (FBC-9)	DATE RECEIVED:	08/13/91
LAB NO:	F6897	DATE COLLECTED:	08/07/91

Lab pH (s.u.).....	7.59
Lab conductivity, umhos/cm.....	480
Lab resistivity, ohm-m.....	20.8
Total dissolved solids (180), mg/L..	252
Total dissolved solids (calc), mg/L.	265
Total suspended solids, mg/L.....	<1
Total alkalinity as CaC03, mg/L.....	252
Total hardness as CaC03, mg/L.....	257
Sodium absorption ratio.....	0.136
Fluoride, mg/L.....	0.26
Sulfide as H2S, mg/L.....	<0.1
Nitrate, mg/L.....	0.23
Nitrite, mg/L.....	<0.02
Ammonia, mg/L.....	0.08

	mg/L	meq/L
Bicarbonate as HC03.....	307	5.03
Carbonate as C03.....	0	0
Chloride.....	5.17	0.15
Sulfate.....	14	0.29
Calcium.....	68.1	3.4
Magnesium.....	21.2	1.74
Potassium.....	0.45	0.01
Sodium.....	5	0.22
Major cations.....		5.37
Major anions.....		5.49
Cation/anion difference.....		1.07 %

Inter-Mountain Laboratories, Inc.

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CLIENT:	Co - Op Coal	DATE REPORTED:	09/11/91
ID:	1015		
SITE:	Tie Fork 20	DATE RECEIVED:	08/13/91
LAB NO:	F6898	DATE COLLECTED:	08/08/91

Lab pH (s.u.).....	8.07
Lab conductivity, umhos/cm.....	471
Lab resistivity, ohm-m.....	21.2
Total dissolved solids (180), mg/L..	250
Total dissolved solids (calc), mg/L.	265
Total suspended solids, mg/L.....	15
Total alkalinity as CaC03, mg/L.....	233
Total hardness as CaC03, mg/L.....	257
Sodium absorption ratio.....	0.125
Fluoride, mg/L.....	0.16
Sulfide as H2S, mg/L.....	<0.1
Nitrate, mg/L.....	<0.02
Nitrite, mg/L.....	<0.02
Ammonia, mg/L.....	0.15

	mg/L	meq/L
Bicarbonate as HC03.....	284	4.66
Carbonate as C03.....	0	0
Chloride.....	4.06	0.11
Sulfate.....	31.3	0.65
Calcium.....	53.7	2.68
Magnesium.....	29.9	2.46
Potassium.....	1.58	0.04
Sodium.....	4.6	0.2
Major cations.....		5.38
Major anions.....		5.43
Cation/anion difference.....		0.41 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
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CLIENT: Co - Op Coal
ID: 1015
SITE: Tie Fork 20
LAB NO: F6898

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	ND	<0.1
Boron (B).....	0.02	<0.01
Barium (Ba).....	0.13	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.01	<0.01
Iron (Fe).....	0.28	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.09	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1110
SITE: Hunting Canyon 21 (FBC-11)
LAB NO: F6899

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.6	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.13	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.01	<0.01
Iron (Fe).....	1.30	<0.05
Manganese (Mn).....	0.05	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.16	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.02	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1110
SITE: Hunting Canyon 21 (FBC-11)
LAB NO: F6899

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	8.36
Lab conductivity, umhos/cm	329
Lab resistivity, ohm-m	30.4
Total dissolved solids (180), mg/L	182
Total dissolved solids (calc), mg/L	179
Total suspended solids, mg/L	20
Total alkalinity as CaC03, mg/L	167
Total hardness as CaC03, mg/L	169
Sodium absorption ratio	0.107
Fluoride, mg/L	0.12
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	0.03
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.14

	mg/L	meq/L
Bicarbonate as HC03	194	3.18
Carbonate as C03	5.1	0.17
Chloride	3.35	0.09
Sulfate	9.88	0.21
Calcium	52.3	2.61
Magnesium	9.39	0.77
Potassium	0.82	0.02
Sodium	3.2	0.14
Major cations		3.54
Major anions		3.65
Cation/anion difference		1.45 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1100
SITE: Head Trail 22 (FBC-10)
LAB NO: F6900

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Lab pH (s.u.)	7.74
Lab conductivity, umhos/cm	478
Lab resistivity, ohm-m	20.9
Total dissolved solids (180), mg/L	244
Total dissolved solids (calc), mg/L	250
Total suspended solids, mg/L	74
Total alkalinity as CaC03, mg/L	241
Total hardness as CaC03, mg/L	244
Sodium absorption ratio	0.15
Fluoride, mg/L	0.31
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	0.39
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.07

	mg/L	meq/L
Bicarbonate as HC03	294	4.82
Carbonate as C03	0	0
Chloride	8.01	0.23
Sulfate	9.05	0.19
Calcium	60	2.99
Magnesium	22.9	1.89
Potassium	0.4	0.01
Sodium	5.4	0.23
Major cations		5.13
Major anions		5.26
Cation/anion difference		1.3 %

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2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1100
SITE: Head Trail 22 (FBC-10)
LAB NO: F6900

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	1.7	<0.1
Boron (B).....	0.02	<0.01
Barium (Ba).....	0.27	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.01	<0.01
Iron (Fe).....	1.27	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.03	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1100
SITE: Head Trail 22 (FB (-10)
LAB NO: F6902 Split

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Lab pH (s.u.)	7.86
Lab conductivity, umhos/cm	483
Lab resistivity, ohm-m	20.7
Total dissolved solids (180), mg/L	238
Total dissolved solids (calc), mg/L	257
Total suspended solids, mg/L	74
Total alkalinity as CaC03, mg/L	243
Total hardness as CaC03, mg/L	254
Sodium absorption ratio	0.164
Fluoride, mg/L	0.29
Sulfide as H2S, mg/L	*
Nitrate, mg/L	0.39
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.04

	mg/L	meq/L
Bicarbonate as HC03	296	4.86
Carbonate as C03	0	0
Chloride	7.91	0.22
Sulfate	10.3	0.21
Calcium	64.2	3.2
Magnesium	22.8	1.88
Potassium	0.44	0.01
Sodium	6	0.26
Major cations		5.35
Major anions		5.32
Cation/anion difference		0.29 %

* Insufficient sample to run duplicate analysis.

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1100
SITE: Head Trail 22 (FBC - 10)
LAB NO: F6902 Split

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	1.9	<0.1
Boron (B).....	0.03	<0.01
Barium (Ba).....	0.27	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	1.32	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.05	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co -Op Coal
ID: 1100
SITE: Hunington Canyon 23
LAB NO: F6901

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	7.80
Lab conductivity, umhos/cm	2050
Lab resistivity, ohm-m	4.88
Total dissolved solids (180), mg/L	1540
Total dissolved solids (calc), mg/L	1490
Total suspended solids, mg/L	652
Total alkalinity as CaC03, mg/L	545
Total hardness as CaC03, mg/L	1190
Sodium absorption ratio	0.642
Fluoride, mg/L	0.61
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	<0.02
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.05

	mg/L	meq/L
Bicarbonate as HC03	665	10.9
Carbonate as C03	0	0
Chloride	81.9	2.31
Sulfate	676	14.1
Calcium	126	6.27
Magnesium	213	17.5
Potassium	10.6	0.27
Sodium	50.9	2.21
Major cations		26.2
Major anions		27.3
Cation/anion difference		1.98 %

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Farmington, New Mexico 87401

CLIENT:	Co -Op Coal	DATE REPORTED:	09/11/91
ID:	1100		
SITE:	Hunington Canyon 23	DATE RECEIVED:	08/13/91
LAB NO:	F6901	DATE COLLECTED:	08/08/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	0.005	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	3.9	<0.1
Boron (B).....	0.12	<0.01
Barium (Ba).....	0.18	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.02	<0.01
Iron (Fe).....	8.67	<0.05
Manganese (Mn).....	0.32	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.03	<0.01
Phosphorus (P).....	1.7	<0.5
Zinc (Zn).....	0.04	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co - Op Coal	DATE REPORTED:	09/16/91
ID:	1500		
SITE:	# 24 (WHR-9)	DATE RECEIVED:	08/13/91
LAB NO:	F6911	DATE COLLECTED:	08/08/91

Lab pH (s.u.).....	8.16
Lab conductivity, umhos/cm.....	482
Lab resistivity, ohm-m.....	20.7
Total dissolved solids (180), mg/L..	270
Total dissolved solids (calc), mg/L.	262
Total suspended solids, mg/L.....	230
Total alkalinity as CaC03, mg/L.....	262
Total hardness as CaC03, mg/L.....	258
Sodium absorption ratio.....	0.065
Fluoride, mg/L.....	0.19
Sulfide as H2S, mg/L.....	<0.1
Nitrate, mg/L.....	0.20
Nitrite, mg/L.....	<0.02
Ammonia, mg/L.....	0.22

	mg/L	meq/L
Bicarbonate as HC03.....	320	5.24
Carbonate as C03.....	0	0
Chloride.....	3.04	0.09
Sulfate.....	6.58	0.14
Calcium.....	76.1	3.8
Magnesium.....	16.6	1.37
Potassium.....	0.22	0.01
Sodium.....	2.4	0.1
Major cations.....		5.27
Major anions.....		5.48
Cation/anion difference.....		1.87 %

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1500
SITE: # 24 (WHR-9)
LAB NO: F6911

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/L

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/L

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.7	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.36	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	0.71	<0.05
Manganese (Mn).....	0.02	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.02	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co - Op Coal	DATE REPORTED:	09/16/91
ID:	1500		
SITE:	# 24 (WHR-9)	DATE RECEIVED:	08/13/91
LAB NO:	F6916 Lab Split	DATE COLLECTED:	08/08/91

Lab pH (s.u.).....	7.86
Lab conductivity, umhos/cm.....	485
Lab resistivity, ohm-m.....	20.6
Total dissolved solids (180), mg/L..	288
Total dissolved solids (calc), mg/L.	262
Total suspended solids, mg/L.....	47
Total alkalinity as CaC03, mg/L.....	264
Total hardness as CaC03, mg/L.....	261
Sodium absorption ratio.....	0.07
Fluoride, mg/L.....	0.24
Sulfide as H2S, mg/L.....	<0.1
Nitrate, mg/L.....	0.20
Nitrite, mg/L.....	<0.02
Ammonia, mg/L.....	0.18

	mg/L	meq/L
Bicarbonate as HC03.....	322	5.28
Carbonate as C03.....	0	0
Chloride.....	2.94	0.08
Sulfate.....	5.35	0.11
Calcium.....	72.9	3.64
Magnesium.....	19.3	1.59
Potassium.....	0.23	0.01
Sodium.....	2.6	0.11
Major cations.....		5.34
Major anions.....		5.48
Cation/anion difference.....		1.28 %

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1500
SITE: # 24 (WHR-9)
LAB NO: F6916 Lab Split

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/L

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/L

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.1	<0.1
Boron (B).....	0.02	<0.01
Barium (Ba).....	0.36	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	0.79	<0.05
Manganese (Mn).....	0.03	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.01	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co - Op Coal	DATE REPORTED:	09/16/91
ID:	1100		
SITE:	# 25 (SBC-12)	DATE RECEIVED:	08/13/91
LAB NO:	F6912	DATE COLLECTED:	08/08/91

Lab pH (s.u.).....	8.23
Lab conductivity, umhos/cm.....	1910
Lab resistivity, ohm-m.....	5.24
Total dissolved solids (180), mg/L..	1640
Total dissolved solids (calc), mg/L.	1560
Total suspended solids, mg/L.....	2
Total alkalinity as CaC03, mg/L.....	264
Total hardness as CaC03, mg/L.....	1180
Sodium absorption ratio.....	0.37
Fluoride, mg/L.....	0.64
Sulfide as H2S, mg/L.....	<0.1
Nitrate, mg/L.....	0.27
Nitrite, mg/L.....	<0.02
Ammonia, mg/L.....	0.05

	mg/L	meq/L
Bicarbonate as HC03.....	322	5.28
Carbonate as C03.....	0	0
Chloride.....	9.43	0.27
Sulfate.....	993	20.7
Calcium.....	148	7.38
Magnesium.....	198	16.2
Potassium.....	24.5	0.63
Sodium.....	29.2	1.27
Major cations.....		25.5
Major anions.....		26.2
Cation/anion difference.....		1.4 %

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1100
SITE: # 25 (SBC-12)
LAB NO: F6912

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/L

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	0.032	<0.005

Trace metals by ICAP (total concentration), mg/L

	Analytical Result:	Detection Limit:
Aluminum (Al).....	0.2	<0.1
Boron (B).....	0.37	<0.01
Barium (Ba).....	0.10	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	0.38	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.09	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Appendix 2

Existing Monitoring Points

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1205
SITE: BC -1
LAB NO: F6904 NPDES

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.).....	8.14	
Lab conductivity, umhos/cm.....	746	
Lab resistivity, ohm-m.....	13.4	
Total dissolved solids (180), mg/L..	404	*
Total dissolved solids (calc), mg/L.	537	
Total suspended solids, mg/L.....	500	
Total alkalinity as CaC03, mg/L.....	270	
Total hardness as CaC03, mg/L.....	457	
Sodium absorption ratio.....	0.206	
Fluoride, mg/L.....	0.38	
Oil and grease (gravimetric), mg/L..	<5	

	mg/L	meq/L
Bicarbonate as HC03.....	329	5.4
Carbonate as C03.....	0	0
Chloride.....	5.17	0.15
Sulfate.....	218	4.55
Calcium.....	62.9	3.14
Magnesium.....	72.9	5.99
Potassium.....	5.32	0.14
Sodium.....	10.1	0.44
Major cations.....		9.71
Major anions.....		10.1
Cation/anion difference.....		1.92 %

* Analyzed twice.

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Iron (Fe).....	5.63	<0.05

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1137
SITE: BC -2
LAB NO: F6905 NPDES

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.).....	8.17
Lab conductivity, umhos/cm.....	622
Lab resistivity, ohm-m.....	16.1
Total dissolved solids (180), mg/L..	424
Total dissolved solids (calc), mg/L.	436
Total suspended solids, mg/L.....	400
Total alkalinity as CaC03, mg/L.....	280
Total hardness as CaC03, mg/L.....	400
Sodium absorption ratio.....	0.157
Fluoride, mg/L.....	0.28
Oil and grease (gravimetric), mg/L..	<5

	mg/L	meq/L
Bicarbonate as HC03.....	342	5.6
Carbonate as C03.....	0	0
Chloride.....	5.17	0.15
Sulfate.....	130	2.71
Calcium.....	61.9	3.09
Magnesium.....	59.8	4.92
Potassium.....	3.68	0.09
Sodium.....	7.2	0.31
Major cations.....		8.42
Major anions.....		8.46
Cation/anion difference.....		0.24 %

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Iron (Fe).....	5.54	<0.05

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co - Op Coal	DATE REPORTED:	09/11/91
ID:	1140		
SITE:	NPDES	DATE RECEIVED:	08/13/91
LAB NO:	F6906	DATE COLLECTED:	08/08/91

Lab pH (s.u.).....	7.88
Lab conductivity, umhos/cm.....	557
Lab resistivity, ohm-m.....	18
Total dissolved solids (180), mg/L..	362
Total dissolved solids (calc), mg/L.	324
Total suspended solids, mg/L.....	<1
Total alkalinity as CaC03, mg/L.....	277
Total hardness as CaC03, mg/L.....	311
Sodium absorption ratio.....	0.116
Fluoride, mg/L.....	0.16
Oil and grease (gravimetric), mg/L..	<5

	mg/L	meq/L
Bicarbonate as HC03.....	339	5.55
Carbonate as C03.....	0	0
Chloride.....	3.65	0.1
Sulfate.....	41.1	0.86
Calcium.....	77.8	3.88
Magnesium.....	28.5	2.34
Potassium.....	1.72	0.04
Sodium.....	4.7	0.2
Major cations.....		6.47
Major anions.....		6.51
Cation/anion difference.....		0.26 %

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Iron (Fe).....	0.23	<0.05

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1105
SITE: SBC 4
LAB NO: F6913

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	8.34
Lab conductivity, umhos/cm	633
Lab resistivity, ohm-m	15.8
Total dissolved solids (180), mg/L	366
Total dissolved solids (calc), mg/L	366
Total suspended solids, mg/L	<1
Total alkalinity as CaC03, mg/L	300
Total hardness as CaC03, mg/L	346
Sodium absorption ratio	0.124
Fluoride, mg/L	0.19
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	0.27
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.04
Oil and grease (gravimetric), mg/L	<5

	mg/L	meq/L
Bicarbonate as HC03	360	5.9
Carbonate as C03	2.7	0.09
Chloride	4.06	0.11
Sulfate	57	1.19
Calcium	87.3	4.36
Magnesium	31.2	2.56
Potassium	1.43	0.04
Sodium	5.3	0.23
Major cations		7.19
Major anions		7.31
Cation/anion difference		0.86 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1105
SITE: SBC 4
LAB NO: F6913

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	ND	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.16	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	ND	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	ND	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1105
SITE: SBC 5
LAB NO: F6914

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	7.53
Lab conductivity, umhos/cm	788
Lab resistivity, ohm-m	12.7
Total dissolved solids (180), mg/L	480
Total dissolved solids (calc), mg/L	478
Total suspended solids, mg/L	1
Total alkalinity as CaC03, mg/L	325
Total hardness as CaC03, mg/L	441
Sodium absorption ratio	0.145
Fluoride, mg/L	0.16
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	0.03
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.03
Oil and grease (gravimetric), mg/L	<5

	mg/L	meq/L
Bicarbonate as HC03	397	6.51
Carbonate as C03	0	0
Chloride	5.78	0.16
Sulfate	121	2.52
Calcium	101	5.05
Magnesium	45.8	3.77
Potassium	2.2	0.06
Sodium	7	0.3
Major cations		9.19
Major anions		9.19
Cation/anion difference		0.03 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1105
SITE: SBC 5
LAB NO: F6914

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	ND	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.11	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	ND	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	ND	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co - Op Coal	DATE REPORTED:	09/11/91
ID:	1410		
SITE:	SBC 9	DATE RECEIVED:	08/13/91
LAB NO:	F6915	DATE COLLECTED:	08/08/91

Lab pH (s.u.).....	8.10
Lab conductivity, umhos/cm.....	565
Lab resistivity, ohm-m.....	17.7
Total dissolved solids (180), mg/L..	340
Total dissolved solids (calc), mg/L.	317
Total suspended solids, mg/L.....	18
Total alkalinity as CaC03, mg/L.....	286
Total hardness as CaC03, mg/L.....	312
Sodium absorption ratio.....	0.091
Fluoride, mg/L.....	0.17
Sulfide as H2S, mg/L.....	<0.1
Nitrate, mg/L.....	<0.02
Nitrite, mg/L.....	<0.02
Ammonia, mg/L.....	0.03
Oil and grease (gravimetric), mg/L..	<5

	mg/L	meq/L
Bicarbonate as HC03.....	349	5.72
Carbonate as C03.....	0	0
Chloride.....	3.85	0.11
Sulfate.....	31.1	0.65
Calcium.....	75.5	3.77
Magnesium.....	29.9	2.46
Potassium.....	1.59	0.04
Sodium.....	3.7	0.16
Major cations.....		6.43
Major anions.....		6.48
Cation/anion difference.....		0.36 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1410
SITE: SBC 9
LAB NO: F6915

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	ND	<0.1
Boron (B).....	0.04	<0.01
Barium (Ba).....	0.15	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.02	<0.01
Iron (Fe).....	0.53	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.25	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.22	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1410
SITE: SBC 9 Lab Split
LAB NO: F6917

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	8.18
Lab conductivity, umhos/cm	561
Lab resistivity, ohm-m	17.8
Total dissolved solids (180), mg/L	340
Total dissolved solids (calc), mg/L	321
Total suspended solids, mg/L	<1
Total alkalinity as CaC03, mg/L	292
Total hardness as CaC03, mg/L	311
Sodium absorption ratio	0.091
Fluoride, mg/L	0.18
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	<0.02
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.04
Oil and grease (gravimetric), mg/L	*

	mg/L	meq/L
Bicarbonate as HC03	356	5.83
Carbonate as C03	0	0
Chloride	4.16	0.12
Sulfate	30.5	0.63
Calcium	78	3.89
Magnesium	28.3	2.33
Potassium	1.61	0.04
Sodium	3.7	0.16
Major cations		6.42
Major anions		6.59
Cation/anion difference		1.29 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1410
SITE: SBC 9 Lab Split
LAB NO: F6917

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	ND	<0.1
Boron (B).....	ND	<0.01
Barium (Ba).....	0.15	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.01	<0.01
Iron (Fe).....	0.55	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.25	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	0.22	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Mining
ID: 1130
SITE: NPDES
LAB NO: F6791

DATE REPORTED: 08/21/91
DATE RECEIVED: 08/01/91
DATE COLLECTED: 07/29/91

Lab pH (s.u.).....	7.89
Lab conductivity, umhos/cm.....	522
Lab resistivity, ohm-m.....	19.2
Total dissolved solids (180), mg/l..	300
Total dissolved solids (calc), mg/l.	299
Total suspended solids, mg/l.....	3
Total alkalinity as CaC03, mg/l.....	247
Total hardness as CaC03, mg/l.....	283
Sodium absorption ratio.....	0.109
Oil and grease (gravimetric), mg/l..	<5.0

	mg/l	meq/l
Bicarbonate as HC03.....	301	4.93
Carbonate as C03.....	0	0
Chloride.....	3.85	0.11
Sulfate.....	46.7	0.97
Calcium.....	64.5	3.22
Magnesium.....	29.7	2.45
Potassium.....	1.71	0.04
Sodium.....	4.2	0.18
Major cations.....		5.89
Major anions.....		6.01
Cation/anion difference.....		1.03 %

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Iron (Fe).....	0.09	<0.05

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co-Op Mining	DATE REPORTED:	08/21/91
ID:	1100		
SITE:	SBC-4	DATE RECEIVED:	08/01/91
LAB NO:	F6794	DATE COLLECTED:	07/29/91

Lab pH (s.u.).....	8.17
Lab conductivity, umhos/cm.....	611
Lab resistivity, ohm-m.....	16.4
Total dissolved solids (180), mg/l..	382
Total dissolved solids (calc), mg/l.	365
Total suspended solids, mg/l.....	24
Total alkalinity as CaC03, mg/l.....	300
Total hardness as CaC03, mg/l.....	347
Sodium absorption ratio.....	0.117
Sulfide as H2S, mg/l.....	<0.10
Nitrate, mg/l.....	0.19
Nitrite, mg/l.....	<0.02
Ammonia, mg/l.....	0.33
Oil and grease (gravimetric), mg/l..	5.70

	mg/l	meq/l
Bicarbonate as HC03.....	365	5.99
Carbonate as C03.....	0	0
Chloride.....	3.85	0.11
Sulfate.....	58	1.21
Calcium.....	82.7	4.13
Magnesium.....	34.2	2.81
Potassium.....	1.55	0.04
Sodium.....	5	0.22
Major cations.....		7.19
Major anions.....		7.31
Cation/anion difference.....		0.8 %

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Iron (Fe).....	0.27	<0.05
Manganese (Mn).....	ND	<0.02

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co-Op Mining	DATE REPORTED:	08/21/91
ID:	1000		
SITE:	SBC-5	DATE RECEIVED:	08/01/91
LAB NO:	F6793	DATE COLLECTED:	07/29/91

Lab pH (s.u.).....	7.97
Lab conductivity, umhos/cm.....	819
Lab resistivity, ohm-m.....	12.2
Total dissolved solids (180), mg/l..	508
Total dissolved solids (calc), mg/l.	480
Total suspended solids, mg/l.....	<1
Total alkalinity as CaC03, mg/l.....	325
Total hardness as CaC03, mg/l.....	436
Sodium absorption ratio.....	0.148
Sulfide as H2S, mg/l.....	0.10
Nitrate, mg/l.....	<0.02
Nitrite, mg/l.....	<0.02
Ammonia, mg/l.....	0.30
Oil and grease (gravimetric), mg/l..	<5.0

	mg/l	meq/l
Bicarbonate as HC03.....	397	6.5
Carbonate as C03.....	0	0
Chloride.....	6.59	0.19
Sulfate.....	124	2.58
Calcium.....	99	4.94
Magnesium.....	46	3.79
Potassium.....	2.28	0.06
Sodium.....	7.1	0.31
Major cations.....		9.09
Major anions.....		9.26
Cation/anion difference.....		0.93 %

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Iron (Fe).....	0.47	<0.05
Manganese (Mn).....	ND	<0.02

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co-Op Mining	DATE REPORTED:	09/04/91
ID:	1215		
SITE:	SBC-9	DATE RECEIVED:	08/01/91
LAB NO:	F6792	DATE COLLECTED:	07/29/91

Lab pH (s.u.).....	8.20
Lab conductivity, umhos/cm.....	570
Lab resistivity, ohm-m.....	17.5
Total dissolved solids (180), mg/l..	312
Total dissolved solids (calc), mg/l.	318
Total suspended solids, mg/l.....	<1
Total alkalinity as CaC03, mg/l.....	290
Total hardness as CaC03, mg/l.....	315
Sodium absorption ratio.....	0.098
Fluoride, mg/l.....	0.17
Sulfide as H2S, mg/l.....	<0.10
Nitrate, mg/l.....	<0.02
Nitrite, mg/l.....	<0.02
Ammonia, mg/l.....	0.22

	mg/l	meq/l
Bicarbonate as HC03.....	354	5.8
Carbonate as C03.....	0	0
Chloride.....	1.62	0.05
Sulfate.....	31.5	0.66
Calcium.....	74.1	3.7
Magnesium.....	31.5	2.59
Potassium.....	1.64	0.04
Sodium.....	4	0.17
Major cations.....		6.51
Major anions.....		6.5
Cation/anion difference.....		0.07 %

Inter Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Mining
ID: 1215
SITE: SBC-9
LAB NO: F6792

DATE REPORTED: 09/04/91
DATE RECEIVED: 08/01/91
DATE COLLECTED: 07/29/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.001
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	ND	<0.1
Boron (B).....	0.15	<0.01
Barium (Ba).....	0.16	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.07	<0.01
Iron (Fe).....	0.08	<0.05
Manganese (Mn).....	ND	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	0.02	<0.01
Phosphorus (P).....	0.8	<0.5
Zinc (Zn).....	0.42	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT:	Co-op Coal	DATE REPORTED:	07/24/91
ID:			
SITE:	Birch Spring	DATE RECEIVED:	06/21/91
LAB NO:	F6545	DATE COLLECTED:	06/17/91

Lab pH (s.u.)	7.84
Lab conductivity, umhos/cm	771
Lab resistivity, ohm-m	13
Total dissolved solids (180), mg/l	500
Total dissolved solids (calc), mg/l	483
Total suspended solids, mg/l	3
Total alkalinity as CaC03, mg/l	328
Total hardness as CaC03, mg/l	442
Sodium absorption ratio	0.145
Fluoride, mg/l	0.17
Nitrate, mg/l	0.05
Nitrite, mg/l	<0.01
Ammonia, mg/l	0.12

	mg/l	meq/l
Bicarbonate as HC03	400	6.55
Carbonate as C03	0	0
Chloride	6.64	0.19
Sulfate	123	2.57
Calcium	101	5.02
Magnesium	46.5	3.82
Potassium	2.64	0.07
Sodium	7	0.3
Major cations		9.21
Major anions		9.31
Cation/anion difference		0.53 %

Inter-Mountain Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Co-op Coal
ID:
SITE: Birch Spring
LAB NO: F6545

DATE REPORTED: 07/24/91
DATE RECEIVED: 06/21/91
DATE COLLECTED: 06/17/91

Trace metals by AA (total concentration), mg/l

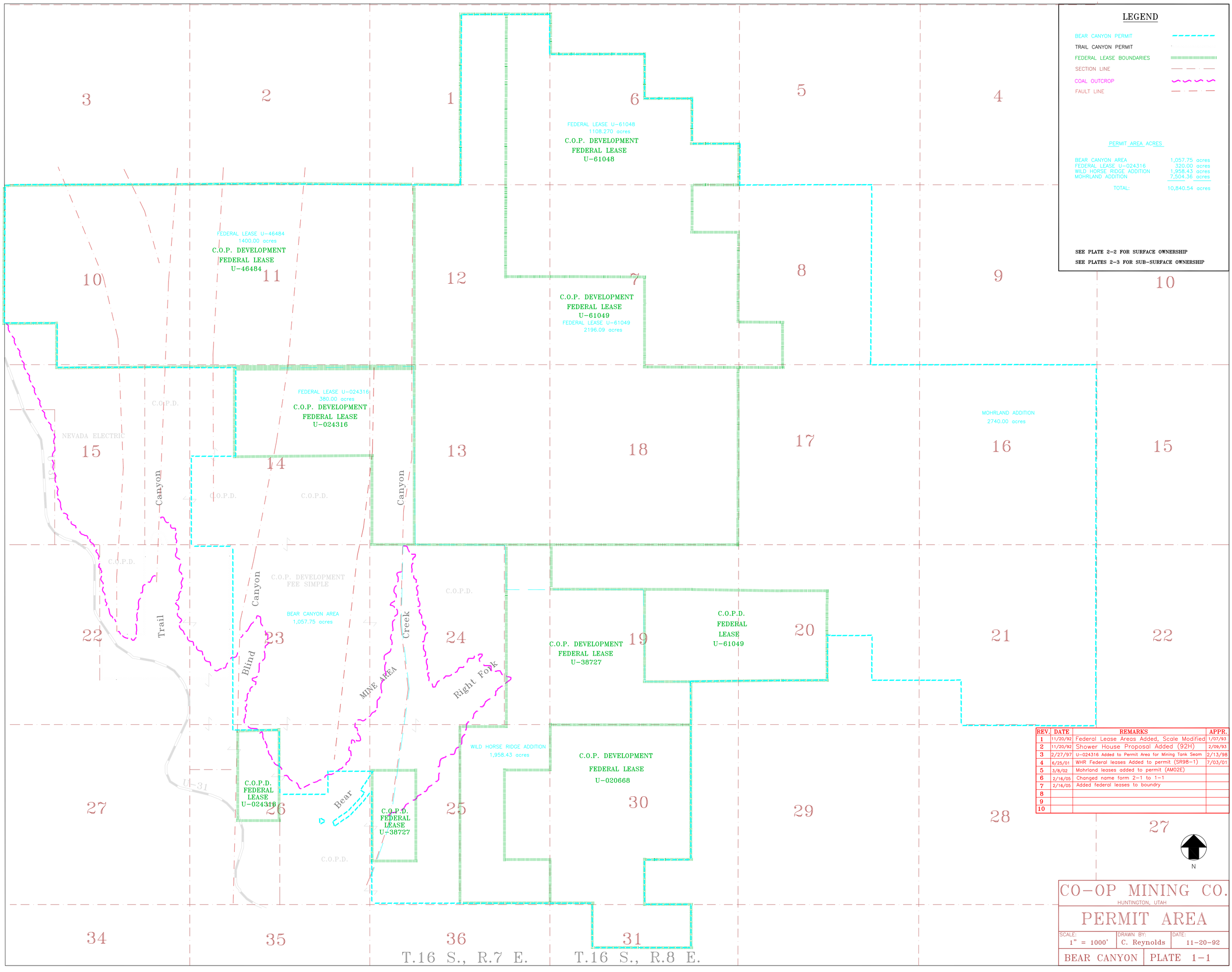
	Analytical Result:	Detection Limit:
Arsenic (As).....	ND	<0.005
Cadmium (Cd).....	ND	<0.05
Mercury (Hg).....	ND	<0.0002
Lead (Pb).....	ND	<0.2
Selenium (Se).....	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al).....	ND	<0.1
Boron (B).....	0.02	<0.01
Barium (Ba).....	0.13	<0.05
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	0.12	<0.05
Manganese (Mn).....	0.02	<0.02
Molybdenum (Mo).....	ND	<0.01
Nickel (Ni).....	ND	<0.01
Phosphorus (P).....	ND	<0.5
Zinc (Zn).....	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager



REV.	DATE	REMARKS	APPR.
1	11/20/92	Federal Lease Areas Added, Scale Modified	1/07/93
2	11/20/92	Shower House Proposal Added (92H)	2/09/93
3	2/27/97	U-024316 Added to Permit Area for Mining Tank Seam	2/13/98
4	6/25/01	WHR Federal leases Added to permit (SR98-1)	7/03/01
5	3/8/02	Mohrland leases added to permit (AM02E)	
6	2/16/05	Changed name form 2-1 to 1-1	
7	2/16/05	Added federal leases to boundry	
8			
9			
10			

CO-OP MINING CO.
HUNTINGTON, UTAH

PERMIT AREA

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. Reynolds	11-20-92

BEAR CANYON | PLATE 1-1

U.S. FOREST SERVICE

ANR

B.L.M

NEVADA ELECTRIC

C.O.P.D

I.P.A

CIMMERON

U.S. FOREST SERVICE

UTAH POWER & LIGHT COMPANY

C.O.P.D

U.S. FOREST SERVICE

CIMMERON

B.L.M

B.L.M

B.L.M

GENWALL COAL CO.

B.L.M

EMERY COUNTY

MALCOLM M. McKINNON

B.L.M

STATE OF UTAH

T.16 S., R.7 E. T.16 S., R.8 E.

LEGEND

BEAR CANYON PERMIT

BUREAU OF LAND MANAGEMENT

CIMMERON

C.O.P. COAL DEVELOPMENT

EMERY COUNTY

GENWALL COAL COMPANY

INTERMOUNTIAN POWER AGENCY

MALCOM M. McKINNON

NEVADA ELECTRIC

STATE OF UTAH

U.S. FOREST SERVICE

UTAH POWER & LIGHT COMPANY

ANR Company, Inc.

SEE PLATE 2-3 FOR COAL OWNERSHIP

SEE TABLE 2-1 FOR PROPERTY OWNERSHIP WITHIN PERMIT AREA (A,B,C,D,E)

EMERY COUNTY ZONING

CRITICAL ENVIRONMENT (CE-1)

MINING AND GRAZING (MG-1)

REV.	DATE	REMARKS	APPR.
1	11/20/92	Federal Lease Areas Added, Scale Modified	1/07/93
2	11/20/92	Surface Ownership Updated	1/07/93
3	11/20/92	Shower House Proposal Added (92H)	2/09/93
4	2/27/97	U-024316 Added to the Permit Area for Mining Tank Seam	2/13/98
5	6/25/01	WHR Federal leases Added to permit (SR98-1)	7/03/01
6	3/8/02	Morhland leases added to permit area (AM02E)	
7	2/16/05	Changed form plate 2-2 to 1-2	
8	2/16/05	Added federal leases to boundry	
9			
10			

N

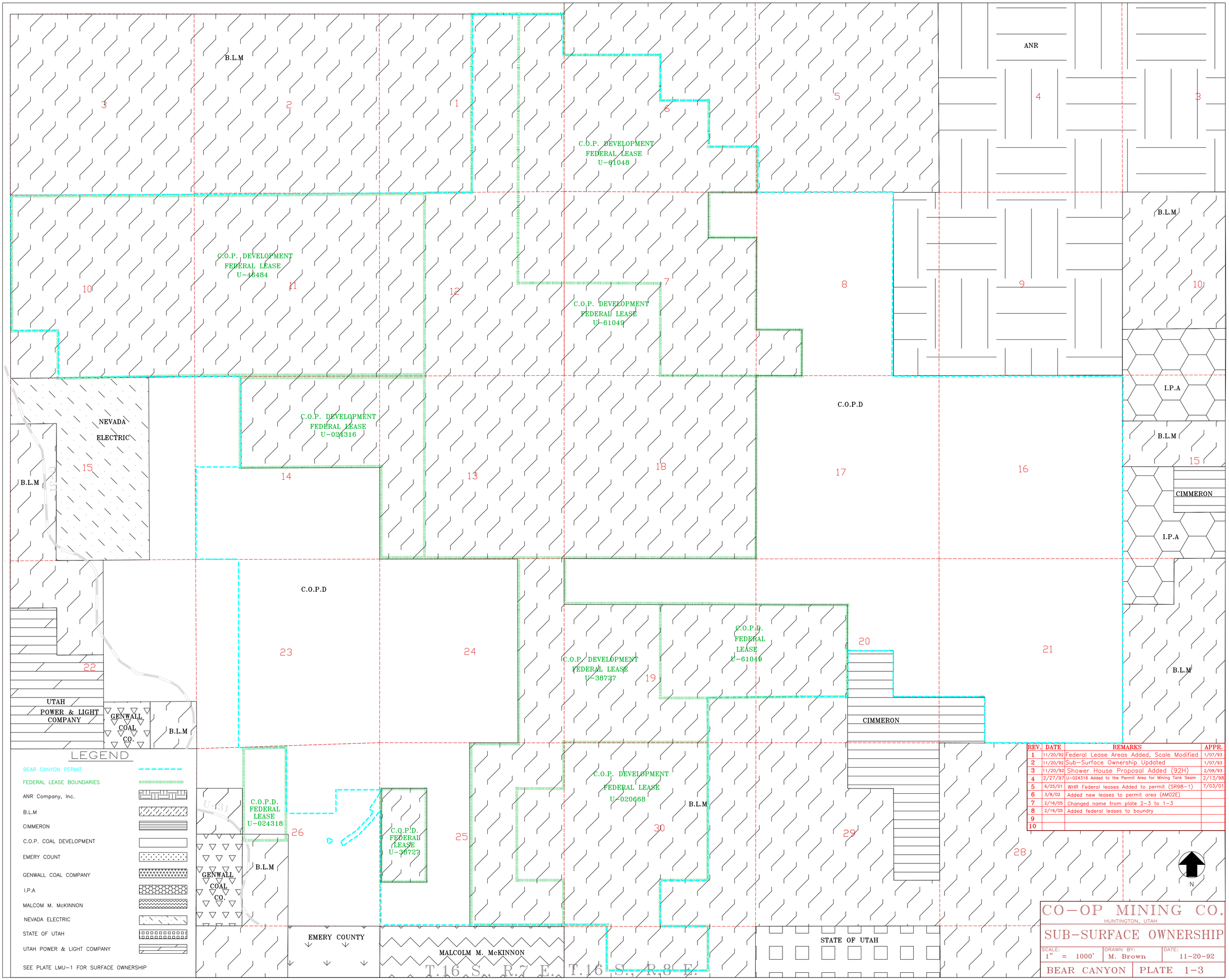
CO-OP MINING CO.

HUNTINGTON, UTAH

SURFACE OWNERSHIP

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. REYNOLDS	11-20-92

BEAR CANYON | PLATE 1-2



REV.	DATE	REMARKS	APPR.
1	11/20/92	Federal Lease Areas Added, Scale Modified	1/07/93
2	11/20/92	Sub-Surface Ownership Updated	1/07/93
3	11/20/92	Shower House Proposal Added (92H)	2/09/93
4	2/27/97	U-024316 Added to the Permit Area for Mining Tank Seam	2/13/98
5	6/25/01	WHR Federal leases Added to permit (SR98-1)	7/03/01
6	3/8/02	Added new leases to permit area (AM02E)	
7	2/16/05	Changed name from plate 2-3 to 1-3	
8	2/16/05	Added federal leases to boundry	
9			
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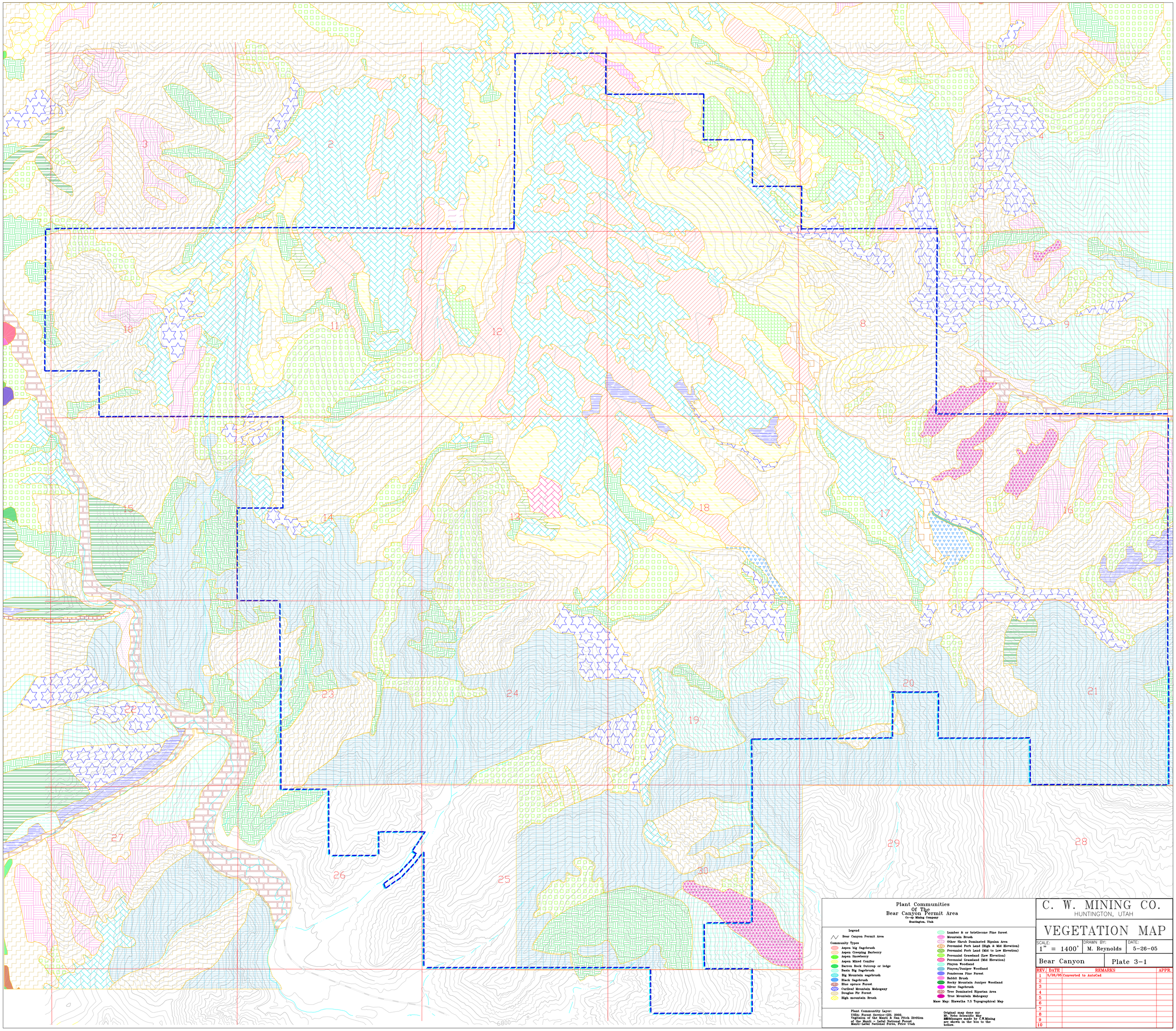
CO-OP MINING CO.

HUNTINGTON, UTAH

SUB-SURFACE OWNERSHIP

SCALE:	DRAWN BY:	DATE:
1" = 1000'	M. Brown	11-20-92

BEAR CANYON | PLATE 1-3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6800
Plant Communities
Of The
Bear Canyon Permit Area
Co-op Mining Company
Huntington, Utah
Legend
Bear Canyon Permit Area
Community Types
Aspen big Sagebrush
Aspen Creeping Barberry
Aspen Snowberry
Aspen Mixed Conifer
Barren Rock Outcrop or ledge
Basin Big Sagebrush
Big Mountain sagebrush
Black Sagebrush
Blue spruce Forest
Curlleaf Mountain Mahogany
Douglas Fir Forest
High mountain Brush
Lumber & or bristlecone Pine forest
Mountain Brush
Other Shrub Dominated Riparian Area
Perennial Forb Land (High & Mid Elevation)
Perennial Forb Land (Mid to Low Elevation)
Perennial Grassland (Low Elevation)
Perennial Grassland (Mid Elevation)
Pinyon Woodland
Pinyon/Juniper Woodland
Ponderosa Pine Forest
Rabbit Brush
Rocky Mountain Juniper Woodland
Silver Sagebrush
Tree Dominated Riparian Area
True Mountain Mahogany
Base Map: Hiawatha 7.5 Topographical Map
Plant Communtity Layer:
USDA Forest Service-GIS, 2002.
Vegtaion of the Manti & San Pitch Divition
of the Manti - LaSal National Forest
Manti-LaSal National Fores, Price Utah
Original map done my
Mt. Nebo Scientific May
2005changes made by C.W.Mining
are shown in the box to the
bellow.
C. W. MINING CO.
HUNTINGTON, UTAH
VEGETATION MAP
SCALE: 1" = 1400'
DRAWN BY: M. Reynolds
DATE: 5-26-05
Bear Canyon
Plate 3-1
REV. DATE REMARKS APPR.
1 5/26/05 Converted to AutoCad
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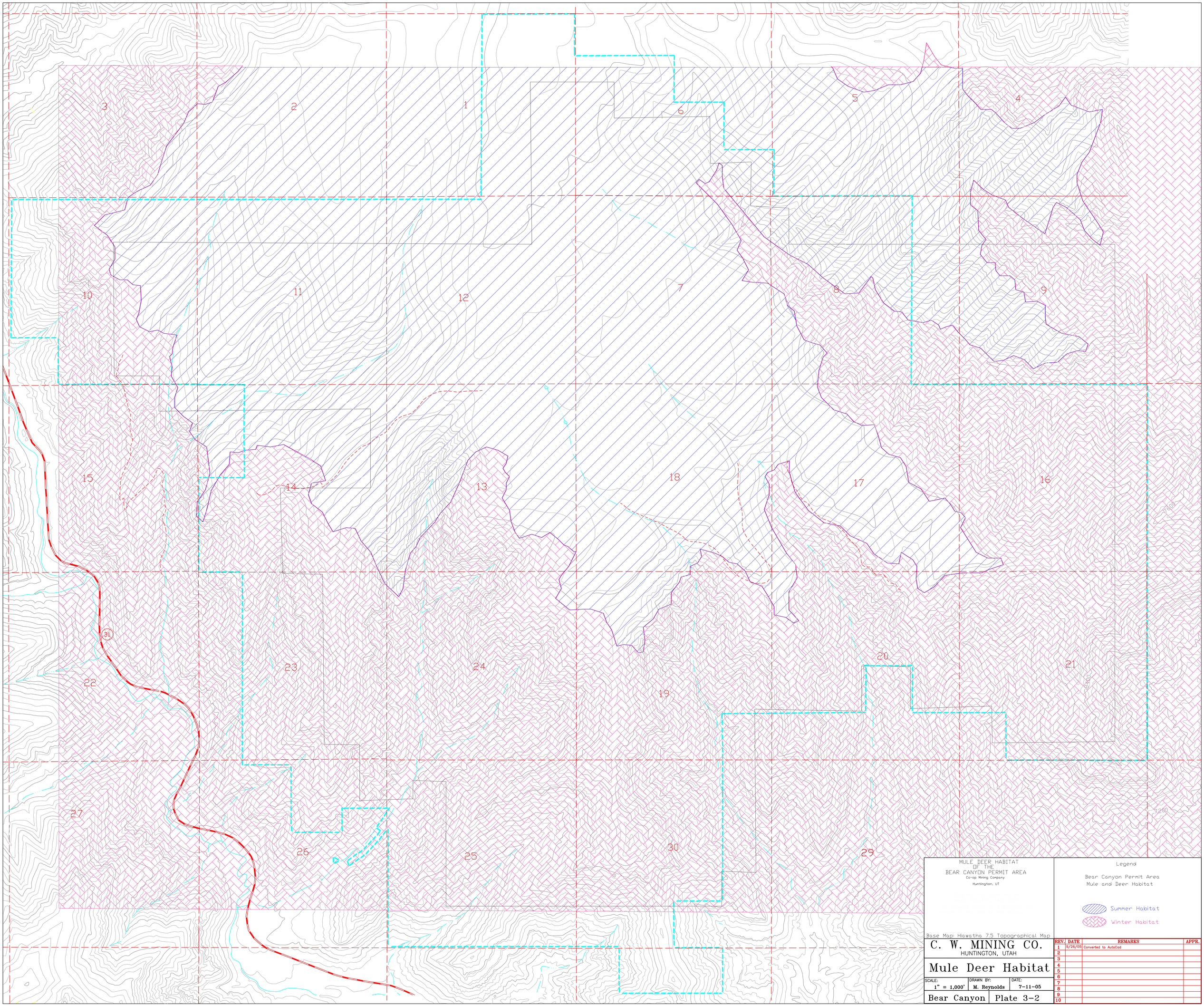
MULE DEER HABITAT
OF THE
BEAR CANYON PERMIT AREA
Co-op Mining Company
Huntington, UT
Base Map: Hiawatha 7.5 Topographical Map
Legend
Bear Canyon Permit Area
Mule and Deer Habitat
Summer Habitat
Winter Habitat
C. W. MINING CO.
HUNTINGTON, UTAH
Mule Deer Habitat
SCALE: 1" = 1,000'
DRAWN BY: M. Reynolds
DATE: 7-11-05
Bear Canyon
Plate 3-2
REV. DATE REMARKS APPR.
1 5/26/05 Converted to AutoCad
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ELK HABITAT
OF THE
BEAR CANYON PERMIT AREA
Co-op Mining Company
Huntington, UT

Original map done my Mt.
Nebo Scientific May 2005
All changes made by C.W.Mining are
shown in the box to the bellow.

Base Map: Hiawatha 7.5 Topographical Map

Legend

Bear Canyon Permit Area
Elk Habitat

Summer Habitat
Winter Habitat

C. W. MINING CO.
HUNTINGTON, UTAH

Elk Habitat of the
Bear Canyon Permit Area

SCALE:	DRAWN BY:	DATE:
1" = 1,000'	M. Reynolds	5-26-05

Bear Canyon | Plate 3-3

REV.	DATE	REMARKS	APPR.
1	5/26/05	Converted to AutoCad	
2			
3			
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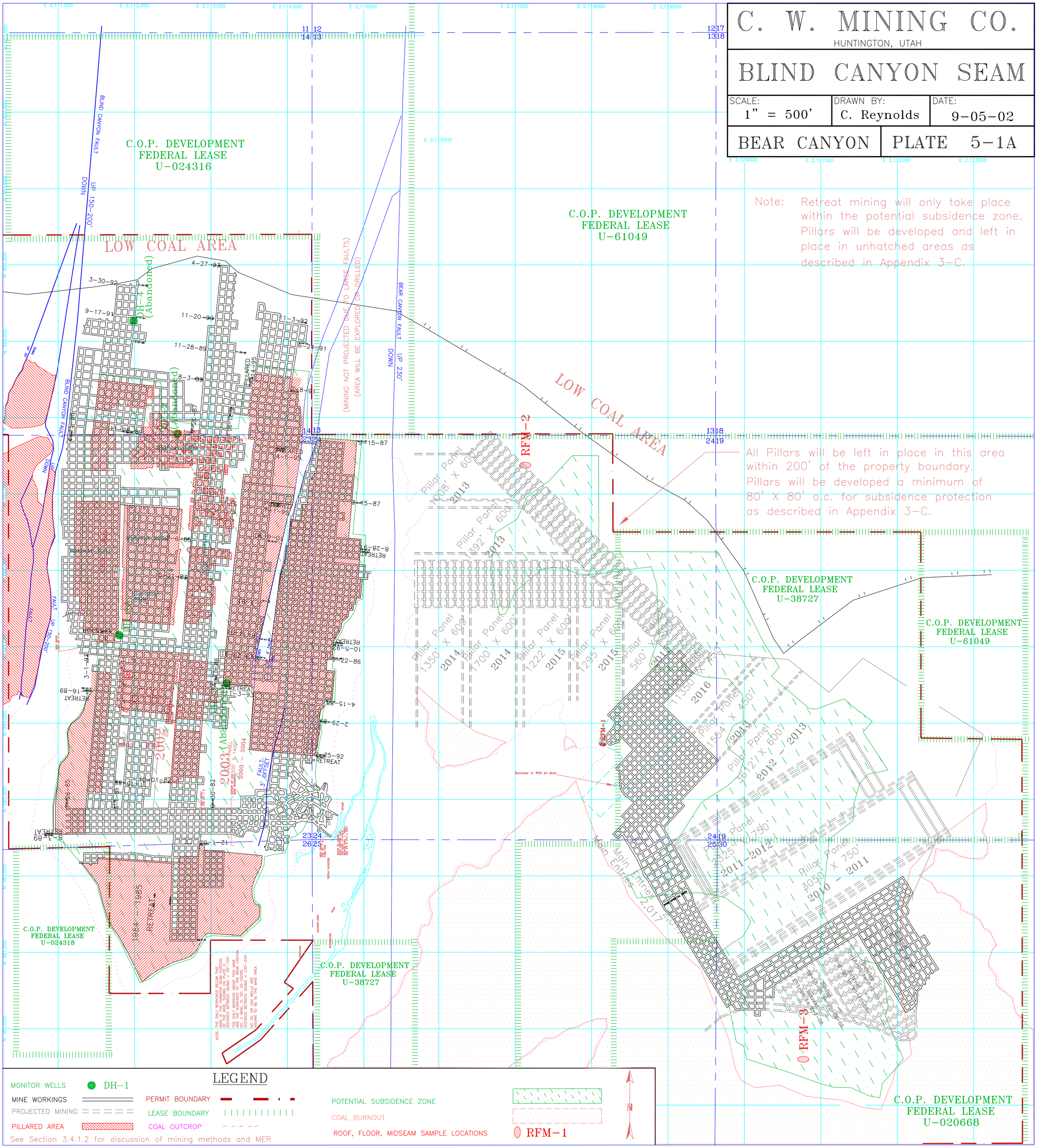
C. W. MINING CO.

HUNTINGTON, UTAH

BLIND CANYON SEAM

SCALE:	DRAWN BY:	DATE:
1" = 500'	C. Reynolds	9-05-02

BEAR CANYON | PLATE 5-1A



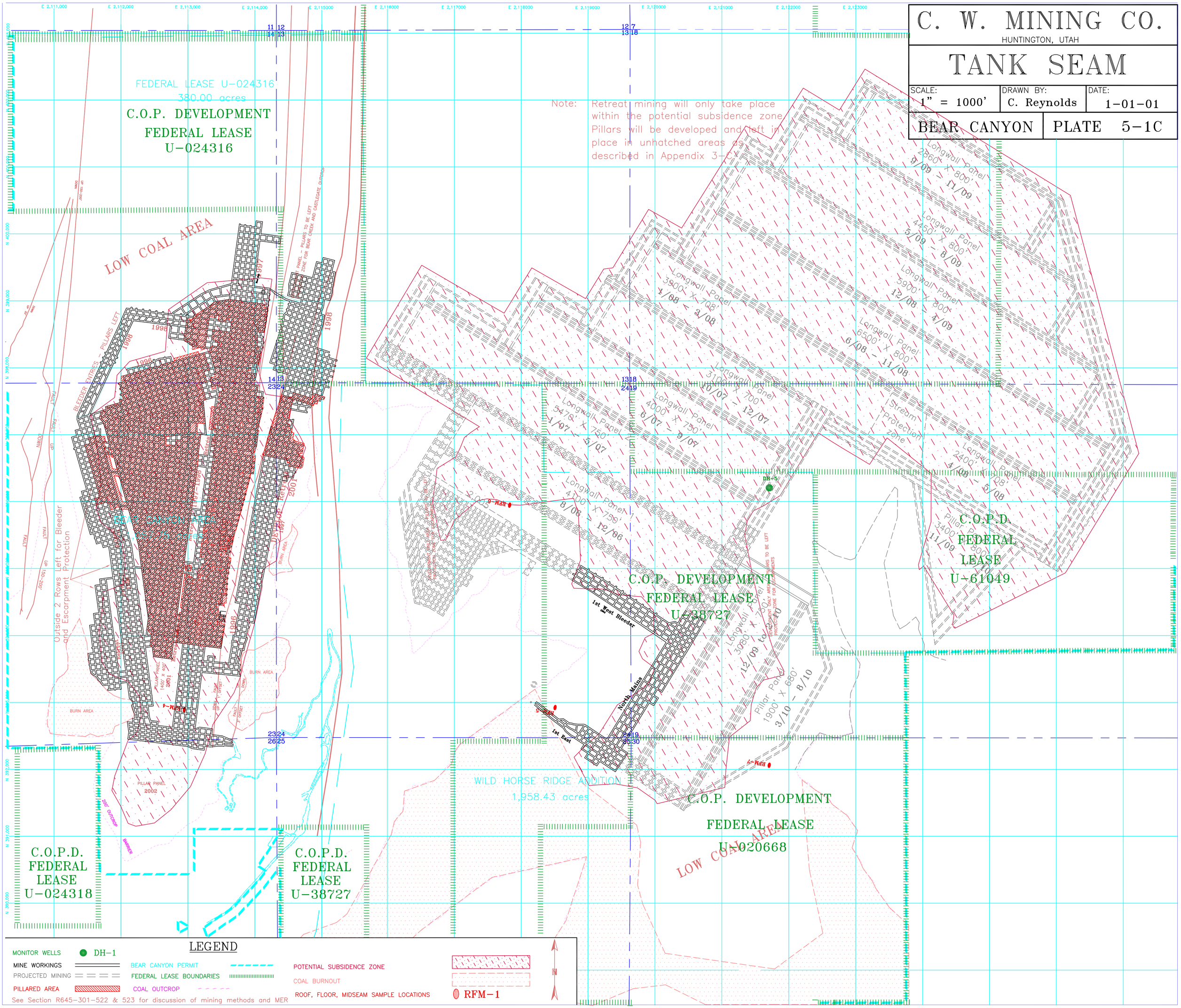
C. W. MINING CO.

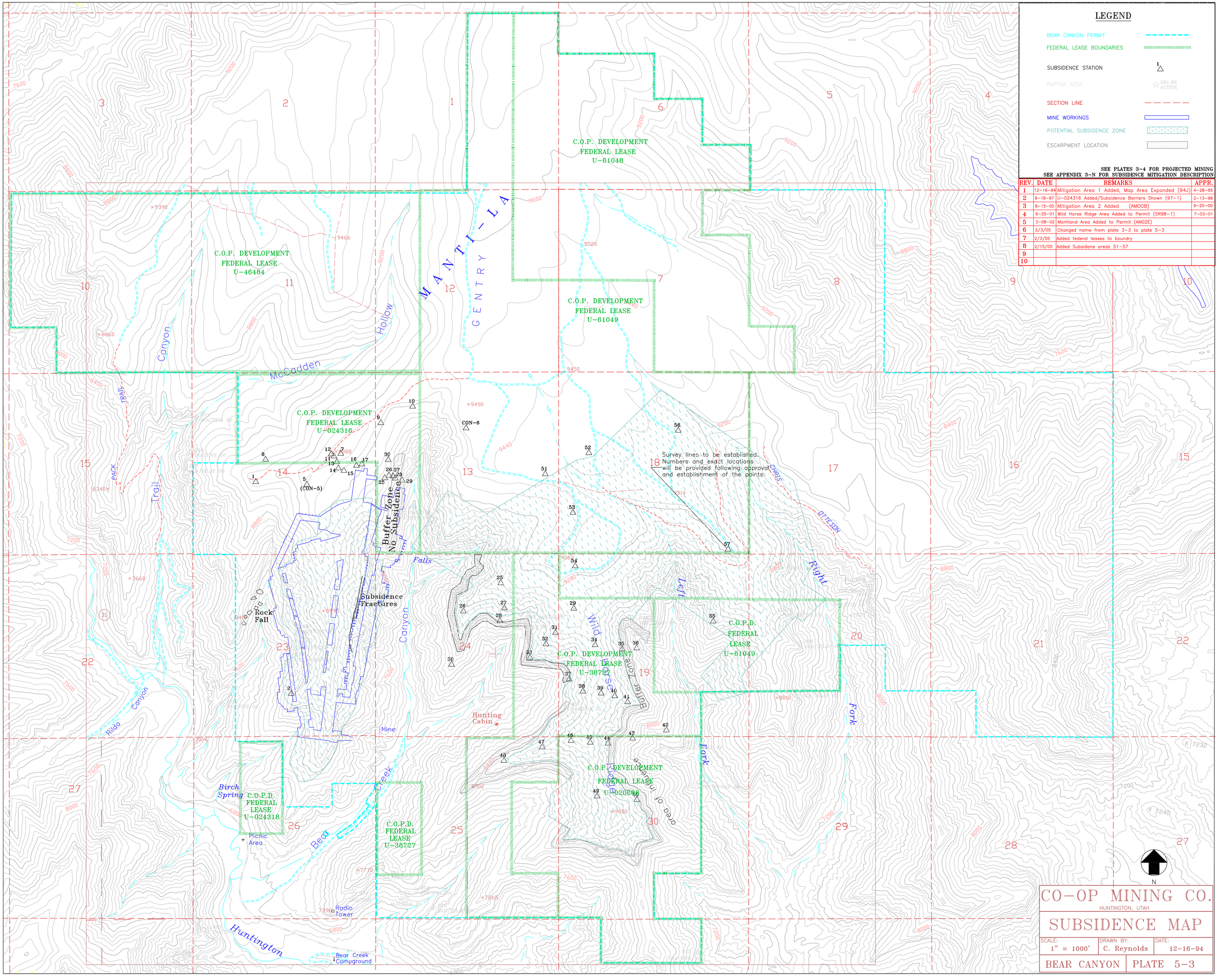
HUNTINGTON, UTAH

TANK SEAM

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. Reynolds	1-01-01

BEAR CANYON | PLATE 5-1C





REV.	DATE	REMARKS	APPR.
1	12-16-94	Mitigation Area 1 Added, Map Area Expanded (94J)	4-28-95
2	6-18-97	U-024316 Added/Subsidence Barriers Shown (97-1)	2-13-98
3	8-15-00	Mitigation Area 2 Added (AM00B)	9-25-00
4	6-25-01	Wild Horse Ridge Area Added to Permit (SR98-1)	7-03-01
5	3-08-02	Morhland Area Added to Permit (AM02E)	
6	2/3/05	Changed name from plate 3-3 to plate 5-3	
7	2/3/05	Added federal leases to boundry	
8	2/15/05	Added Subsidane areas 51-57	
9			
10			

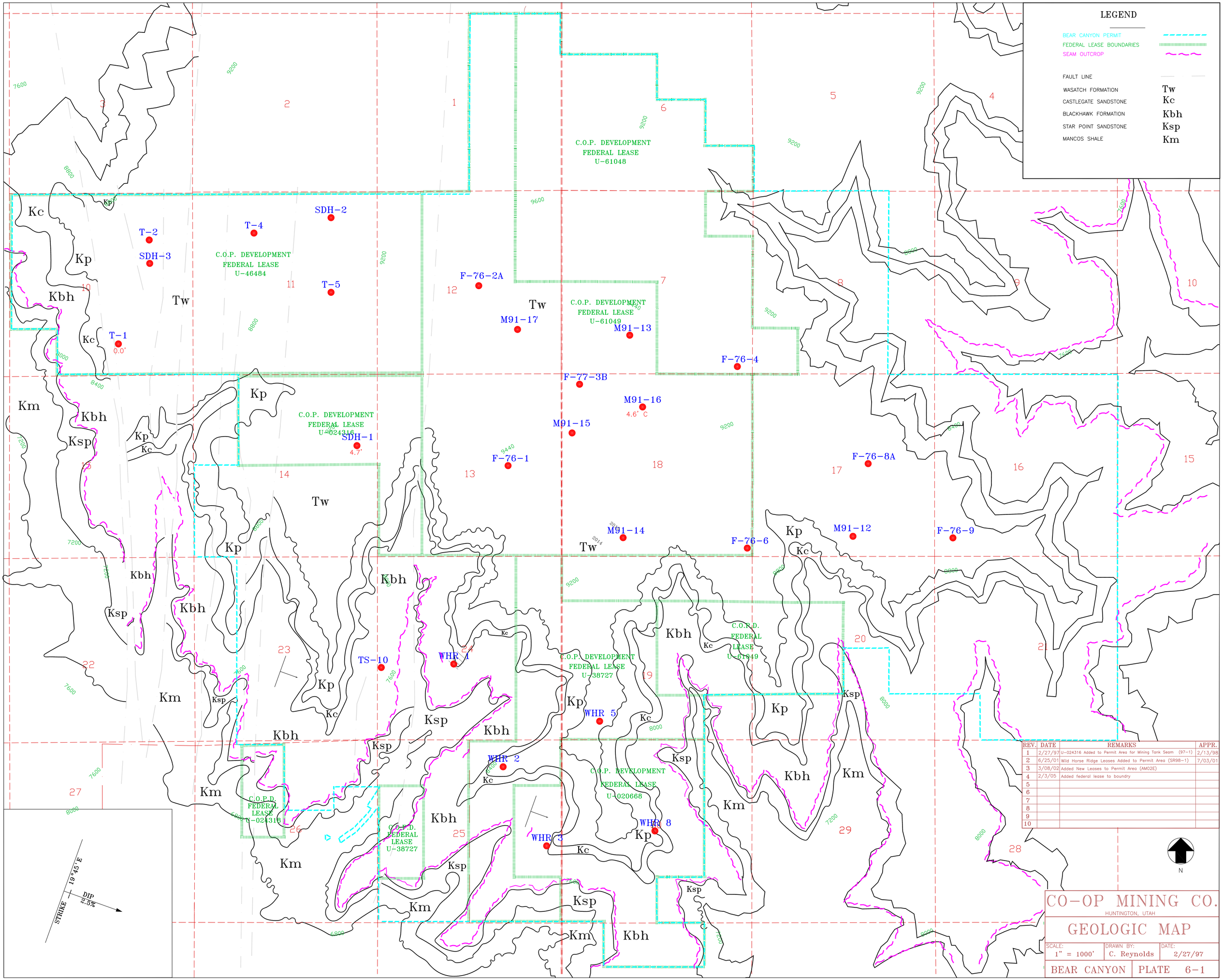
CO-OP MINING CO.

HUNTINGTON, UTAH

SUBSIDENCE MAP

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. Reynolds	12-16-94

BEAR CANYON | PLATE 5-3



REV.	DATE	REMARKS	APPR.
1	2/27/97	U-024316 Added to Permit Area for Mining Tank Seam (97-1)	2/13/98
2	6/25/01	Wild Horse Ridge Leases Added to Permit Area (SR98-1)	7/03/01
3	3/08/02	Added New Leases to Permit Area (AM02E)	
4	2/3/05	Added federal lease to boundry	
5			
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8			
9			
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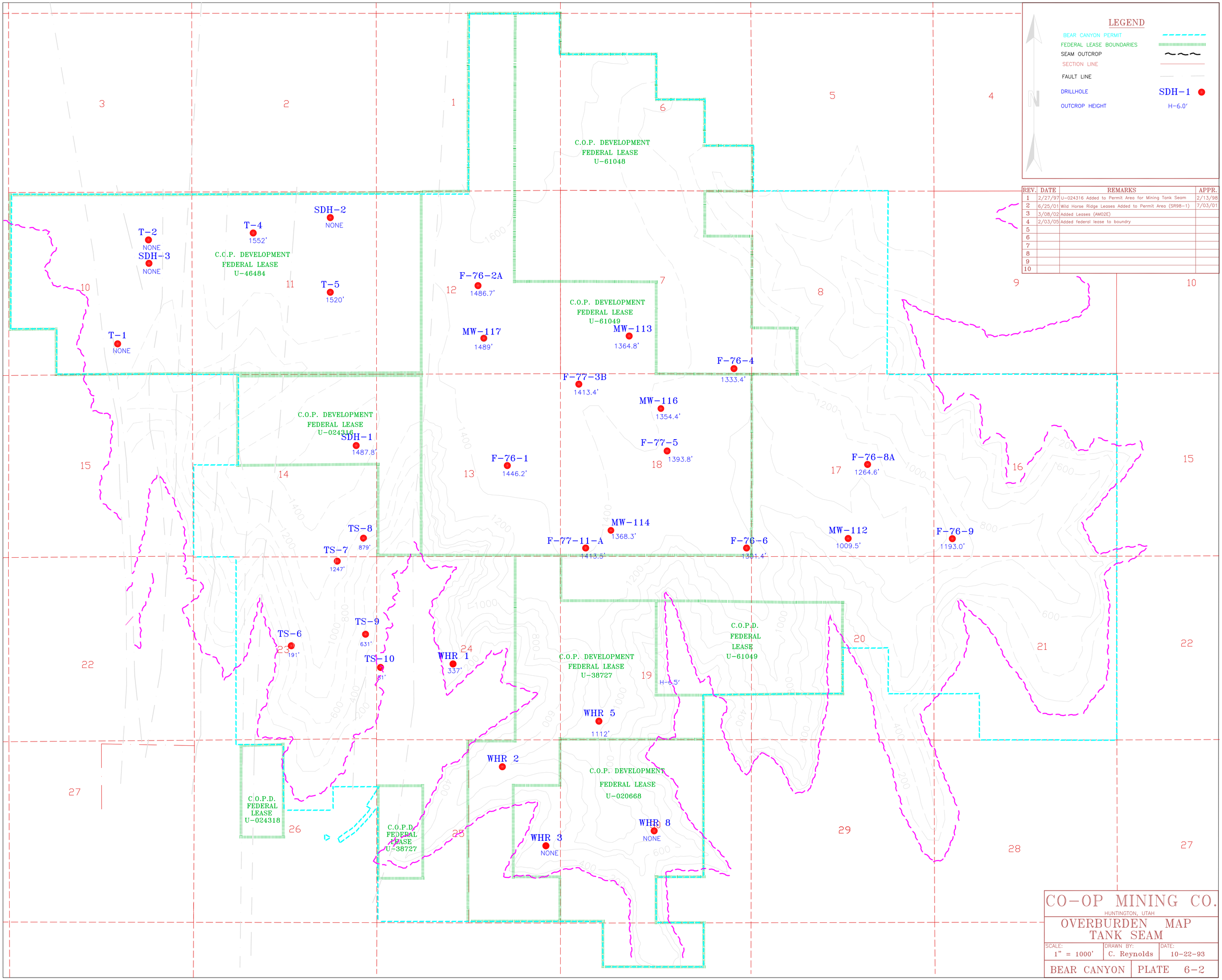

REV.	DATE	REMARKS	APPR.
1	2/27/97	U-024316 Added to Permit Area for Mining Tank Seam	2/13/98
2	6/25/01	Wild Horse Ridge Leases Added to Permit Area (SR98-1)	7/03/01
3	3/08/02	Added Leases (AM02E)	
4	2/03/05	Added federal lease to boundry	
5			
6			
7			
8			
9			
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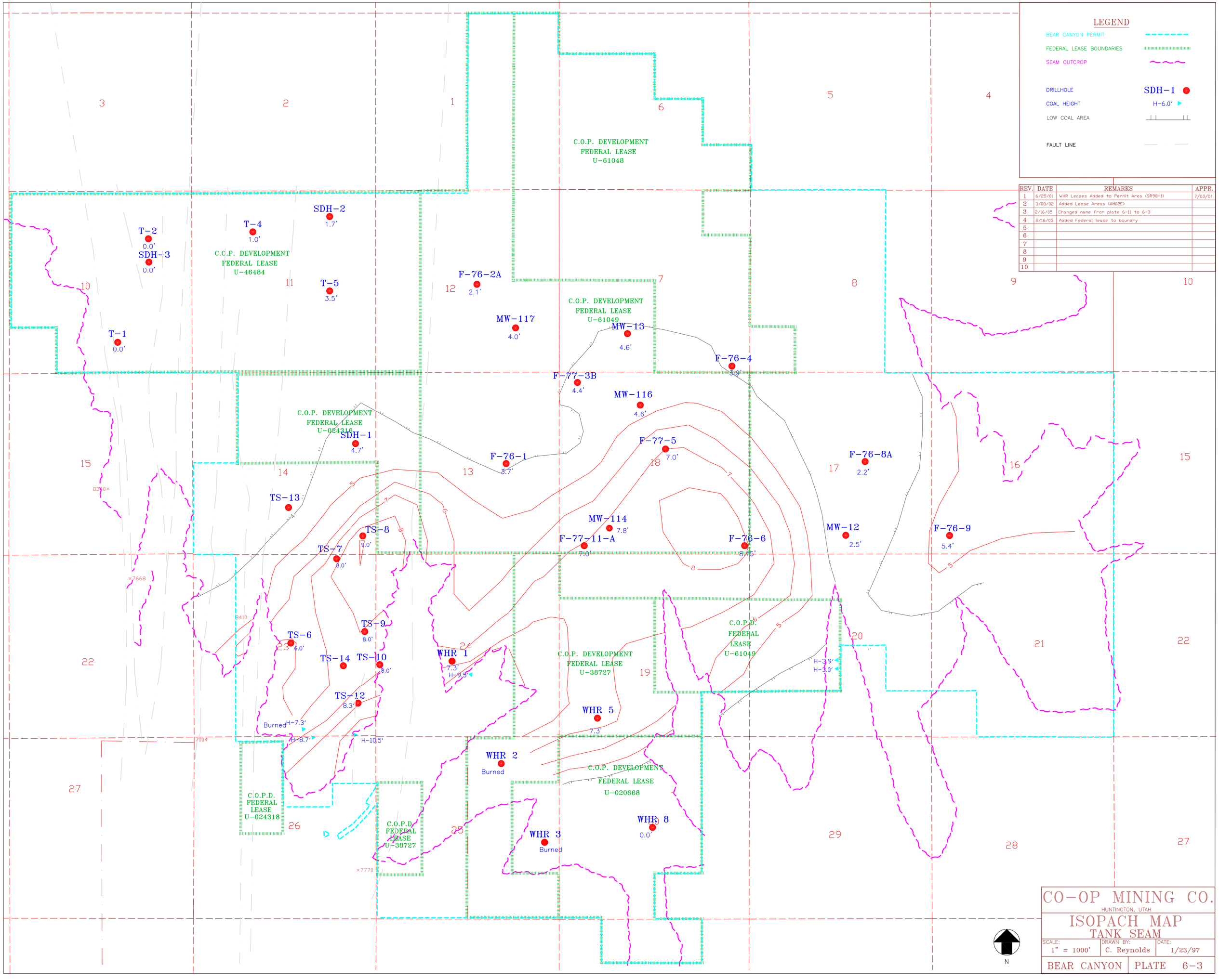
CO-OP MINING CO.
HUNTINGTON, UTAH

OVERBURDEN MAP
TANK SEAM

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. Reynolds	10-22-93

BEAR CANYON | PLATE 6-2



REV.	DATE	REMARKS	APPR.
1	6/25/01	WHR Leases Added to Permit Area (SR98-1)	7/03/01
2	3/08/02	Added Lease Areas (AM02E)	
3	2/16/05	Changed name from plate 6-11 to 6-3	
4	2/16/05	Added Federal lease to boundry	
5			
6			
7			
8			
9			
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CO-OP MINING CO.
HUNTINGTON, UTAH

ISOPACH MAP
TANK SEAM

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. Reynolds	1/23/97

BEAR CANYON | PLATE 6-3

CO-OP MINING CO.

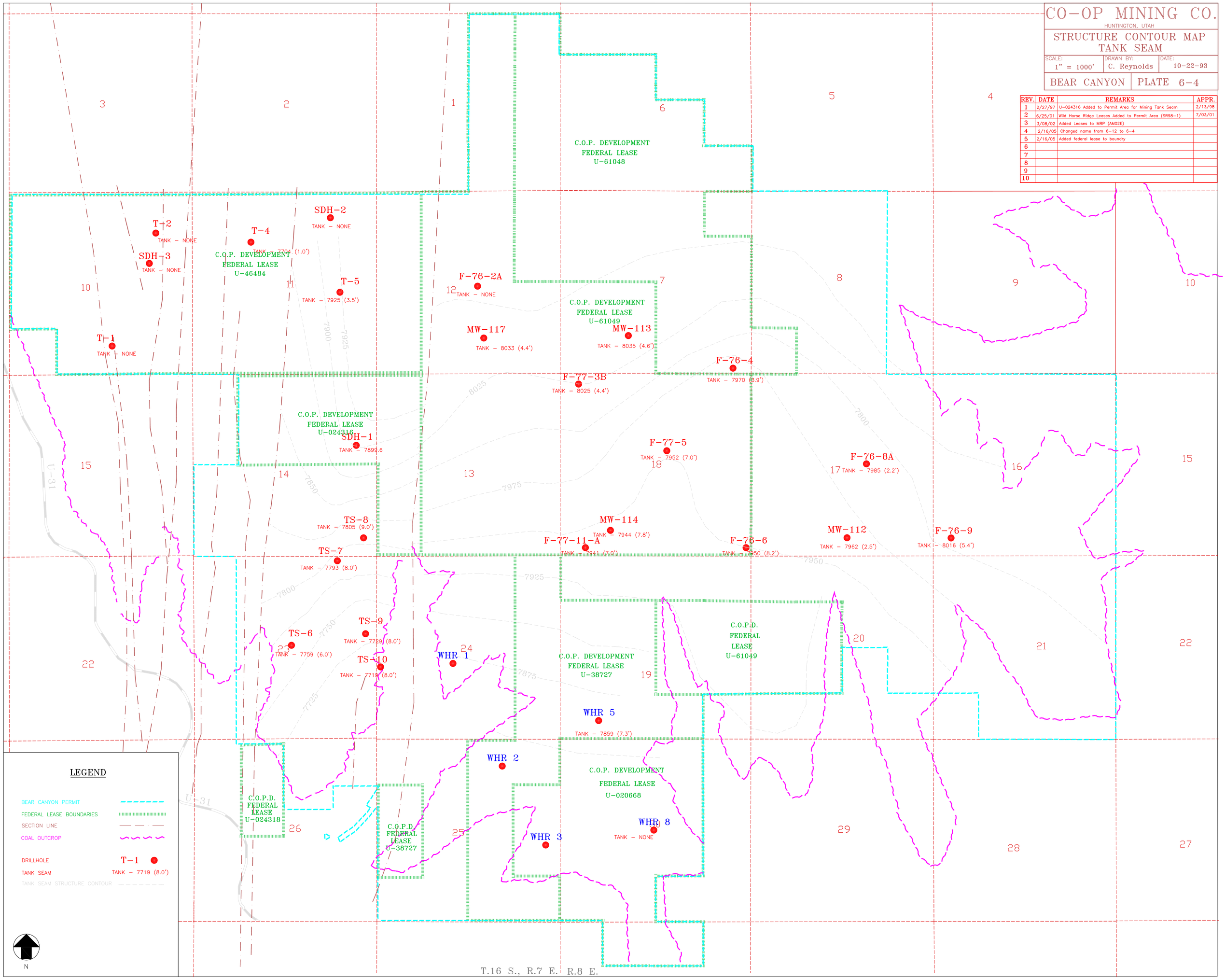
HUNTINGTON, UTAH

STRUCTURE CONTOUR MAP TANK SEAM

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. Reynolds	10-22-93

BEAR CANYON | PLATE 6-4

REV.	DATE	REMARKS	APPR.
1	2/27/97	U-024316 Added to Permit Area for Mining Tank Seam	2/13/98
2	6/25/01	Wild Horse Ridge Leases Added to Permit Area (SR98-1)	7/03/01
3	3/08/02	Added Leases to MRP (AM02E)	
4	2/16/05	Changed name from 6-12 to 6-4	
5	2/16/05	Added federal lease to boundry	
6			
7			
8			
9			
10			



REV.	DATE	REMARKS	APPR.
1	2/27/97	U-024316 Added to Permit Area for Mining Tank Seam	2/13/98
2	6/25/01	Wild Horse Ridge Leases Added to Permit Area (SR98-1)	7/03/01
3	3/08/02	Added Leases (AM02E)	
4	2/16/05	Changed name from 6-9 to 6-5	
5			
6			
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8			
9			
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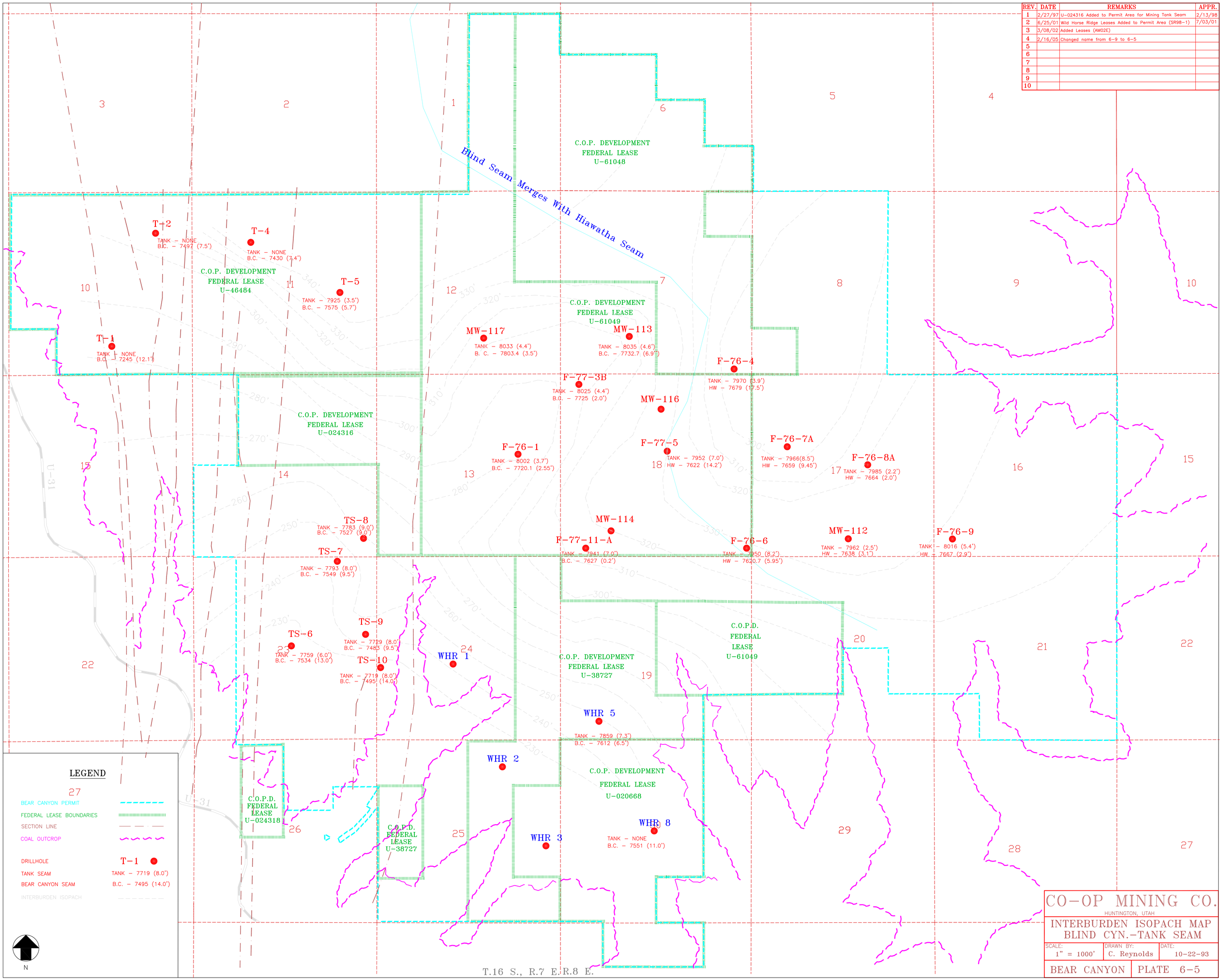
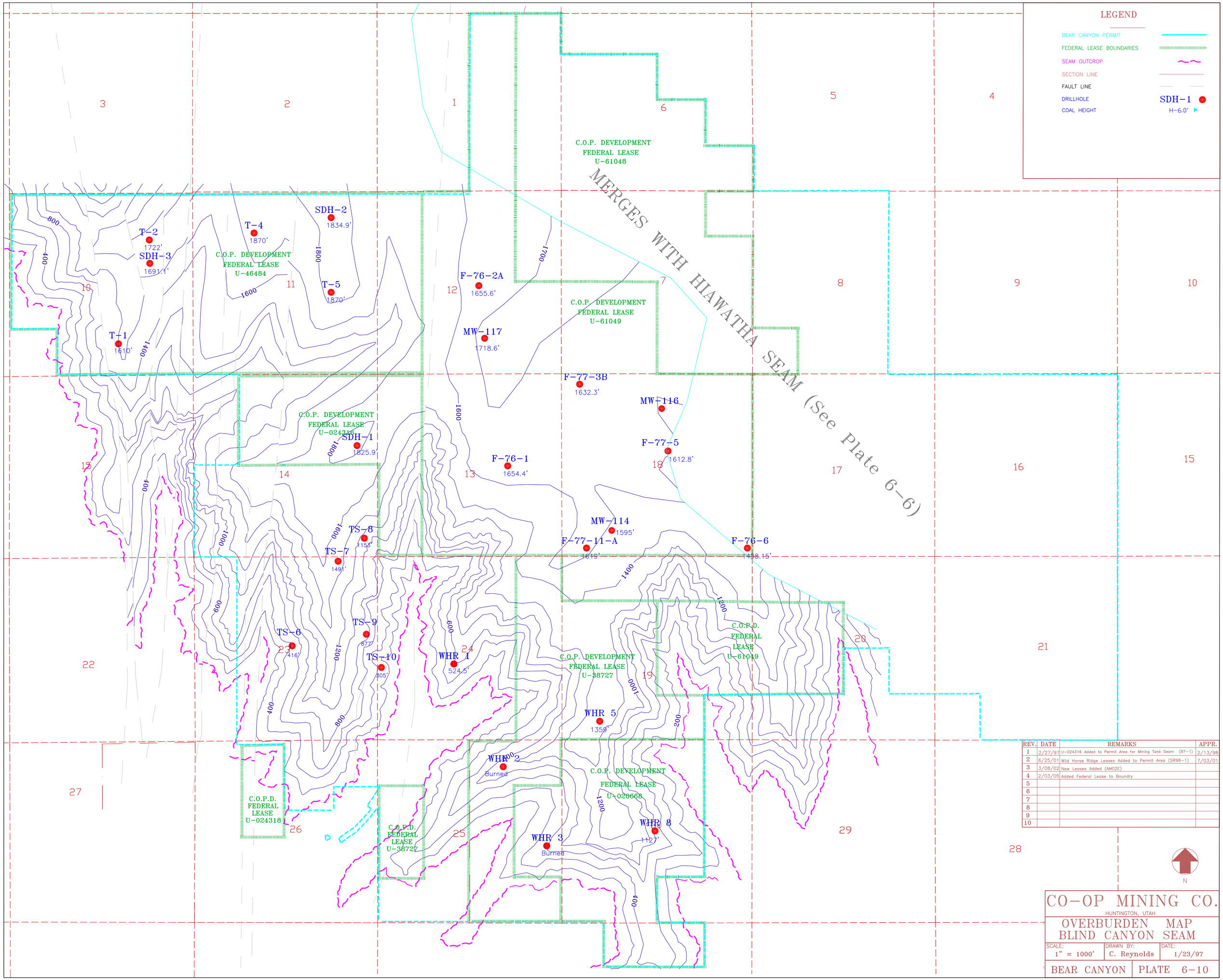


CO-OP MINING CO.
HUNTINGTON, UTAH

INTERBURDEN ISOPACH MAP
BLIND CYN.-TANK SEAM

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. Reynolds	10-22-93

BEAR CANYON | PLATE 6-5



REV.	DATE	REMARKS	APPR.
1	2/27/97	U-024316 Added to Permit Area for Mining Tank Seam (97-1)	2/13/98
2	6/25/01	Wild Horse Ridge Leases Added to Permit Area (SR98-1)	7/03/01
3	3/08/02	New Leases Added (AM02E)	
4	2/03/05	Added Federal Lease to Boundry	
5			
6			
7			
8			
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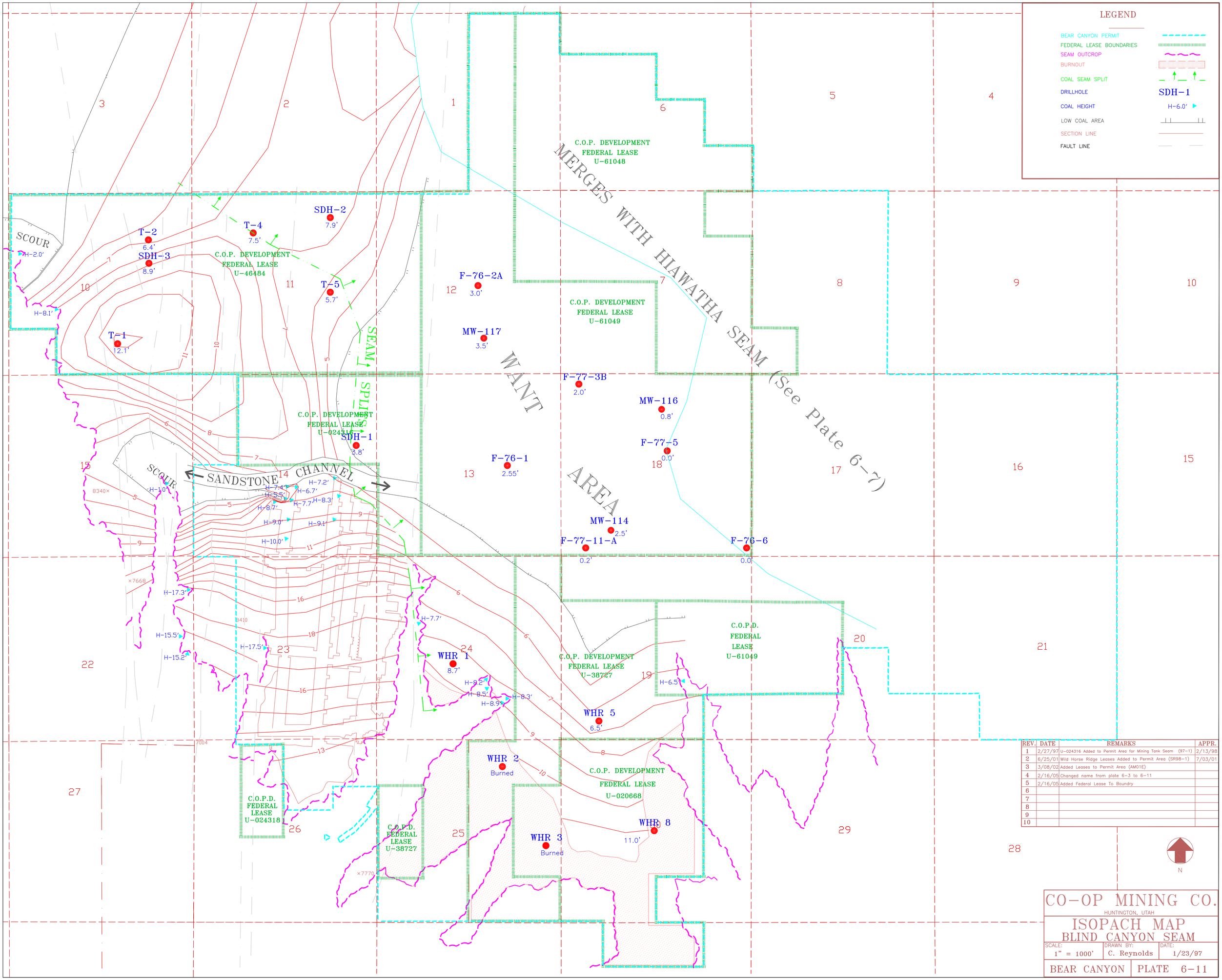
CO-OP MINING CO.
HUNTINGTON, UTAH

OVERBURDEN MAP
BLIND CANYON SEAM

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. Reynolds	1/23/97

BEAR CANYON PLATE 6-10



REV.	DATE	REMARKS	APPR.
1	2/27/97	U-024316 Added to Permit Area for Mining Tank Seam (97-1)	2/13/98
2	6/25/01	Wild Horse Ridge Leases Added to Permit Area (SR98-1)	7/03/01
3	3/08/02	Added Leases to Permit Area (AM01E)	
4	2/16/05	Changed name from plate 6-3 to 6-11	
5	2/16/05	Added Federal Lease To Boundry	
6			
7			
8			
9			
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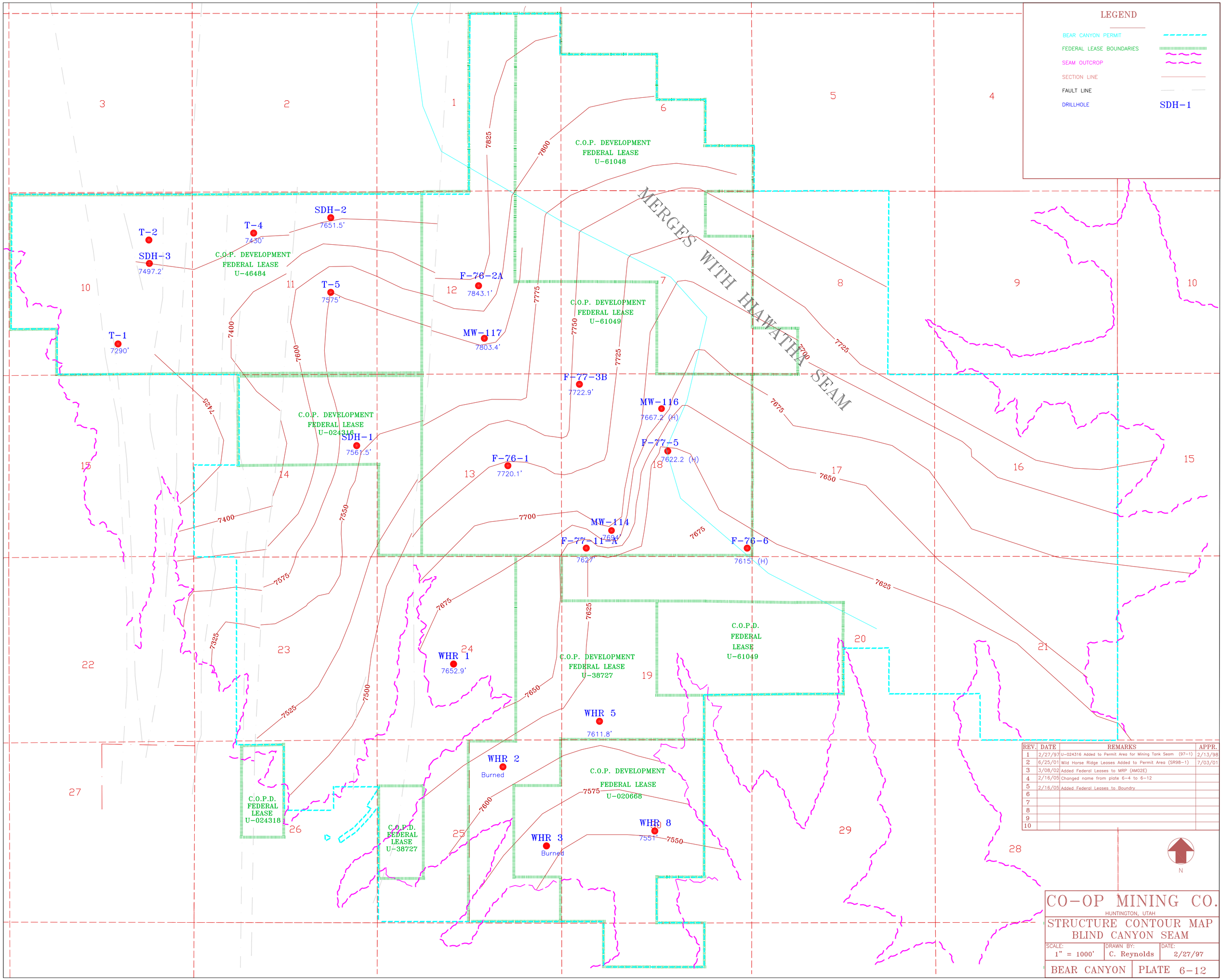
CO-OP MINING CO.
HUNTINGTON, UTAH

ISOPACH MAP
BLIND CANYON SEAM

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. Reynolds	1/23/97

BEAR CANYON | PLATE 6-11



REV.	DATE	REMARKS	APPR.
1	2/27/97	U-024316 Added to Permit Area for Mining Tank Seam (97-1)	2/13/98
2	6/25/01	Wild Horse Ridge Leases Added to Permit Area (SR98-1)	7/03/01
3	3/08/02	Added Federal Leases to MRP (AM02E)	
4	2/16/05	Changed name from plate 6-4 to 6-12	
5	2/16/05	Added Federal Leases to Boundry	
6			
7			
8			
9			
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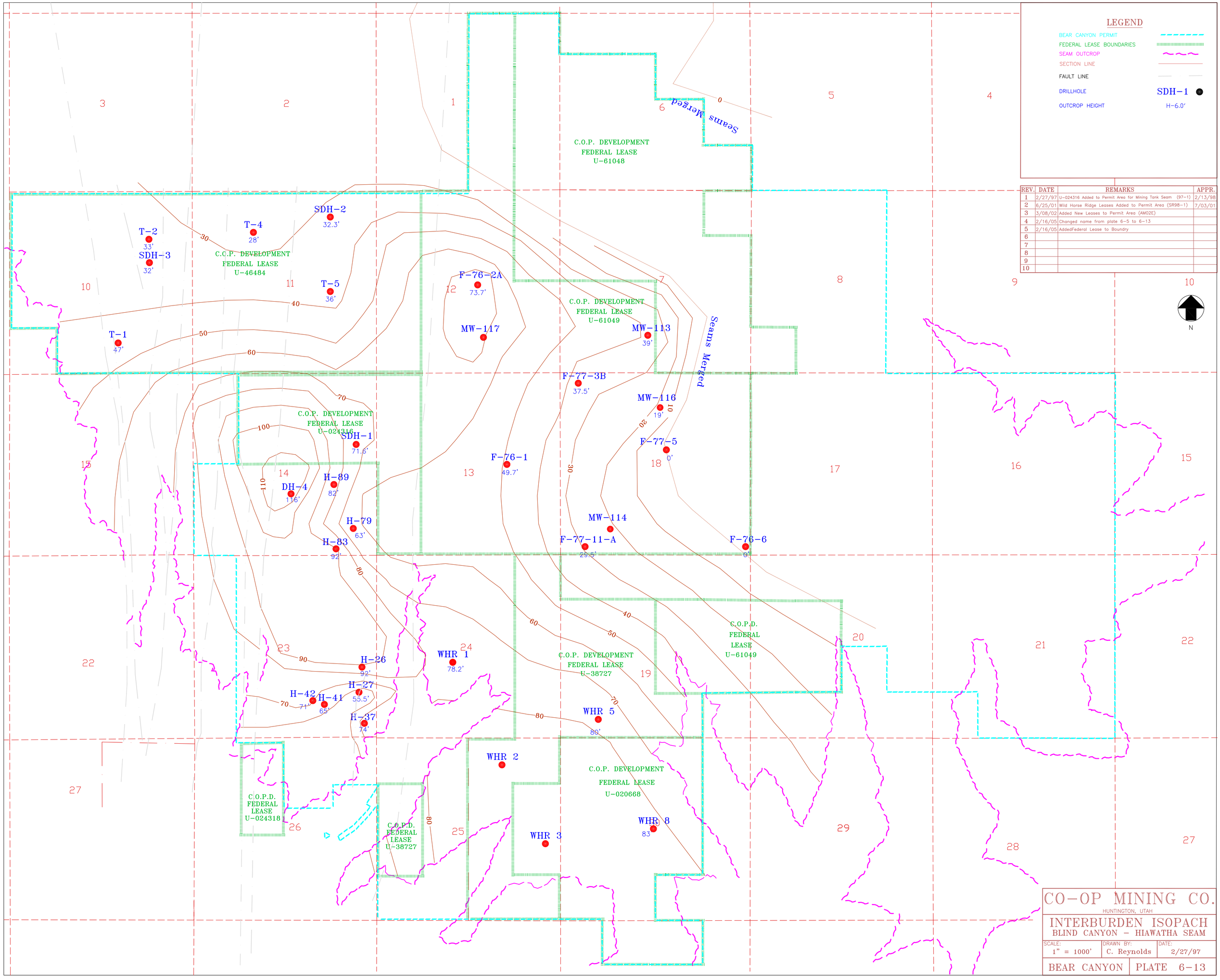
CO-OP MINING CO.
HUNTINGTON, UTAH

STRUCTURE CONTOUR MAP
BLIND CANYON SEAM

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. Reynolds	2/27/97

BEAR CANYON | PLATE 6-12

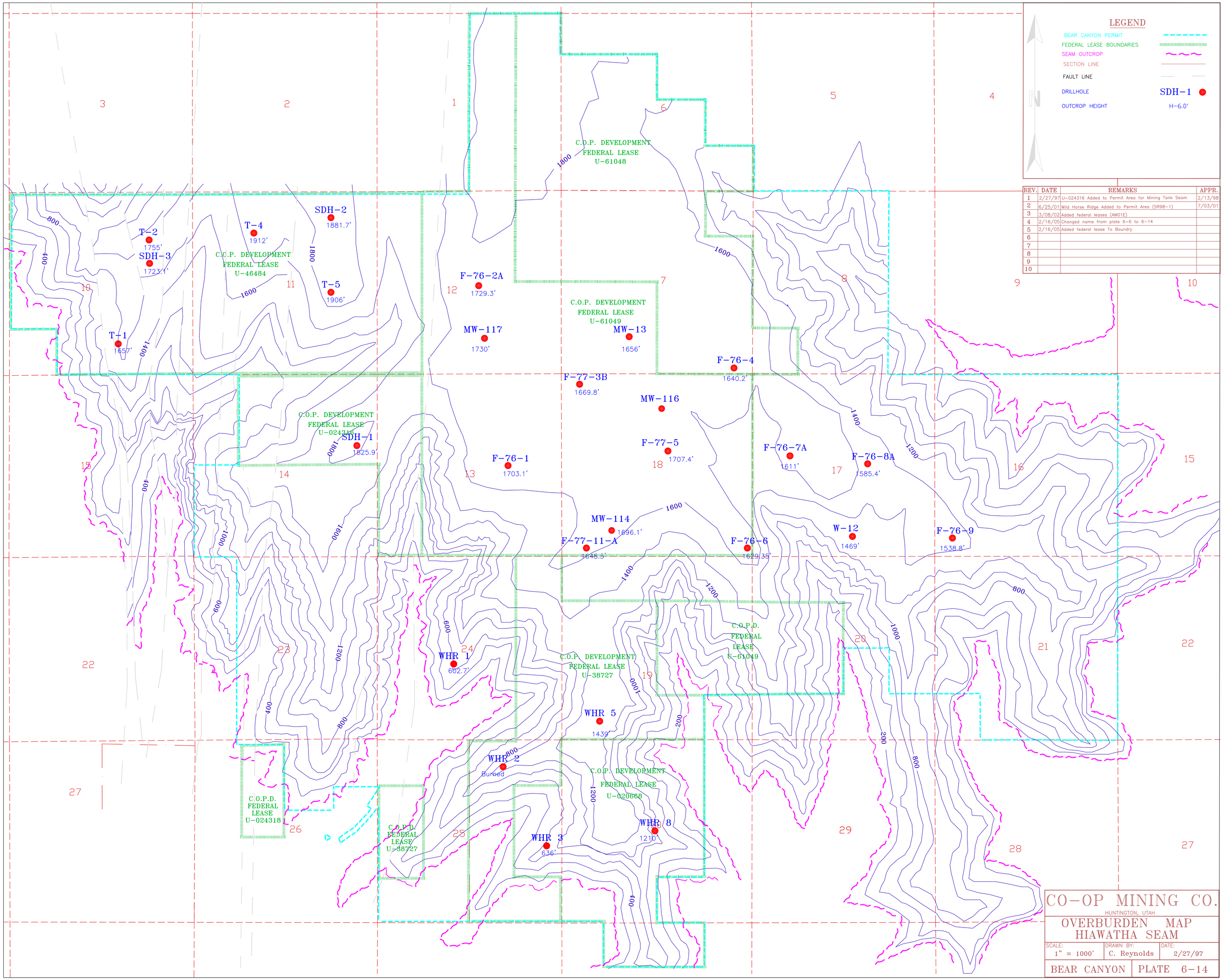


CO-OP MINING CO.
HUNTINGTON, UTAH

INTERBURDEN ISOPACH
BLIND CANYON - HIAWATHA SEAM

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. Reynolds	2/27/97

BEAR CANYON | PLATE 6-13


LEGEND
BEAR CANYON PERMIT
FEDERAL LEASE BOUNDARIES
SEAM OUTCROP
SECTION LINE
FAULT LINE
DRILLHOLE
SDH-1
OUTCROP HEIGHT
H-6.0'
N
C.O.P. DEVELOPMENT
FEDERAL LEASE
U-61048
C.O.P. DEVELOPMENT
FEDERAL LEASE
U-46484
C.O.P. DEVELOPMENT
FEDERAL LEASE
U-61049
C.O.P. DEVELOPMENT
FEDERAL LEASE
U-024316
C.O.P.D.
FEDERAL
LEASE
U-61049
C.O.P. DEVELOPMENT
FEDERAL LEASE
U-38727
C.O.P. DEVELOPMENT
FEDERAL LEASE
U-020668
C.O.P.D.
FEDERAL
LEASE
U-024318
C.O.P.D.
FEDERAL
LEASE
U-38727
T-2
1755'
SDH-3
1723.1'
T-4
1912'
SDH-2
1881.7'
T-5
1906'
T-1
1657'
F-76-2A
1729.3'
MW-117
1730'
MW-13
1656'
F-76-4
1640.2'
F-77-3B
1669.8'
MW-116
SDH-1
1825.9'
F-77-5
1707.4'
F-76-1
1703.1'
F-76-7A
1611'
F-76-8A
1585.4'
MW-114
1696.1'
F-77-11-A
1648.5'
F-76-6
1629.35'
W-12
1469'
F-76-9
1538.8'
WHR 1
602.7'
WHR 5
1439'
WHR 2
Buried
WHR 3
636'
WHR 8
1210'
REV. DATE REMARKS APPR.
1 2/27/97 U-024316 Added to Permit Area for Mining Tank Seam 2/13/98
2 6/25/01 Wild Horse Ridge Added to Permit Area (SR98-1) 7/03/01
3 3/08/02 Added federal leases (AM01E)
4 2/16/05 Changed name from plate 6-6 to 6-14
5 2/16/05 Added federal lease To Boundry
6
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8
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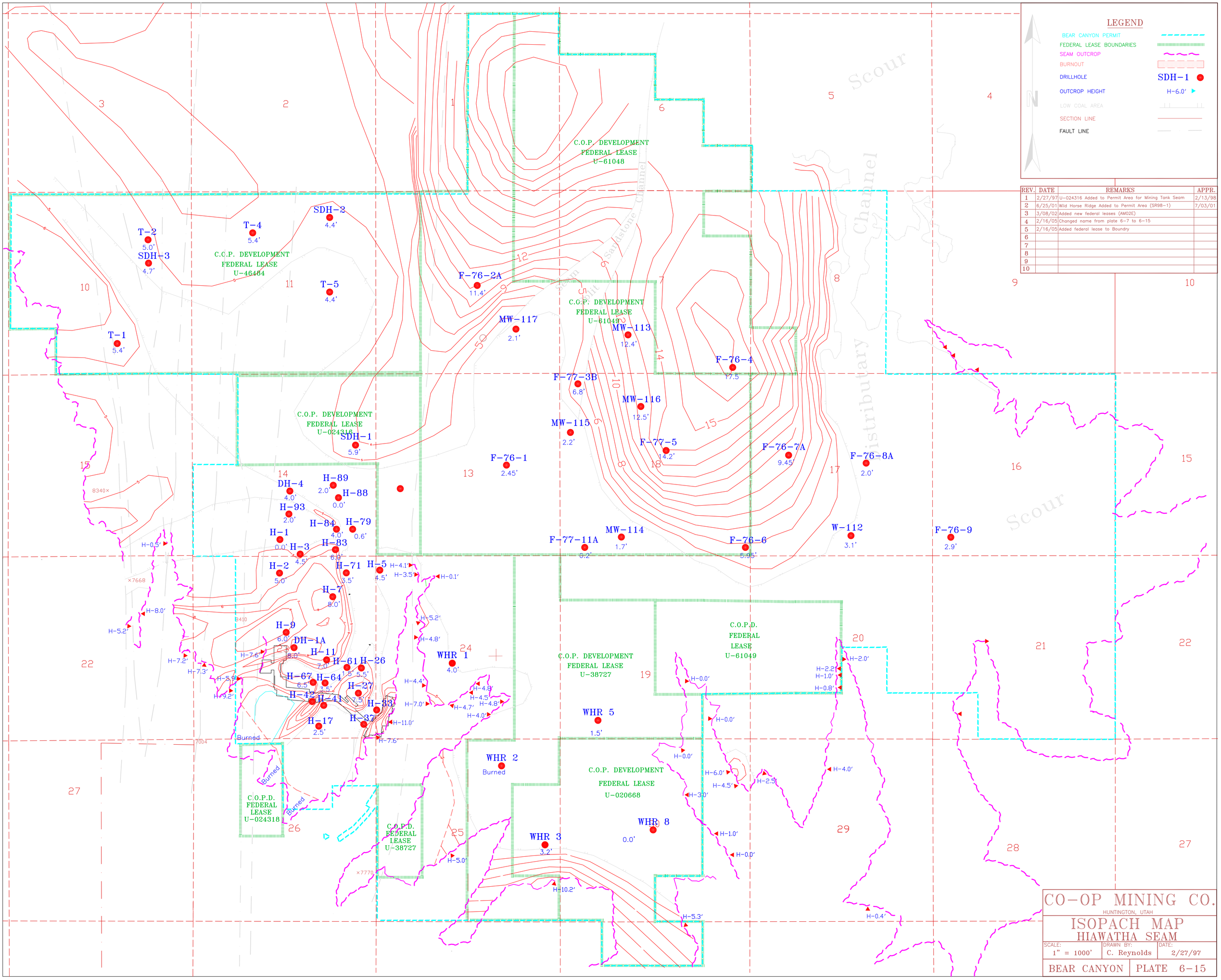
CO-OP MINING CO.
HUNTINGTON, UTAH
OVERBURDEN MAP
HIAWATHA SEAM
SCALE: 1" = 1000'
DRAWN BY: C. Reynolds
DATE: 2/27/97
BEAR CANYON
PLATE 6-14



REV.	DATE	REMARKS	APPR.
1	2/27/97	U-024316 Added to Permit Area for Mining Tank Seam	2/13/98
2	6/25/01	Wild Horse Ridge Added to Permit Area (SR98-1)	7/03/01
3	3/08/02	Added new federal leases (AM02E)	
4	2/16/05	Changed name from plate 6-7 to 6-15	
5	2/16/05	Added federal lease to Boundry	
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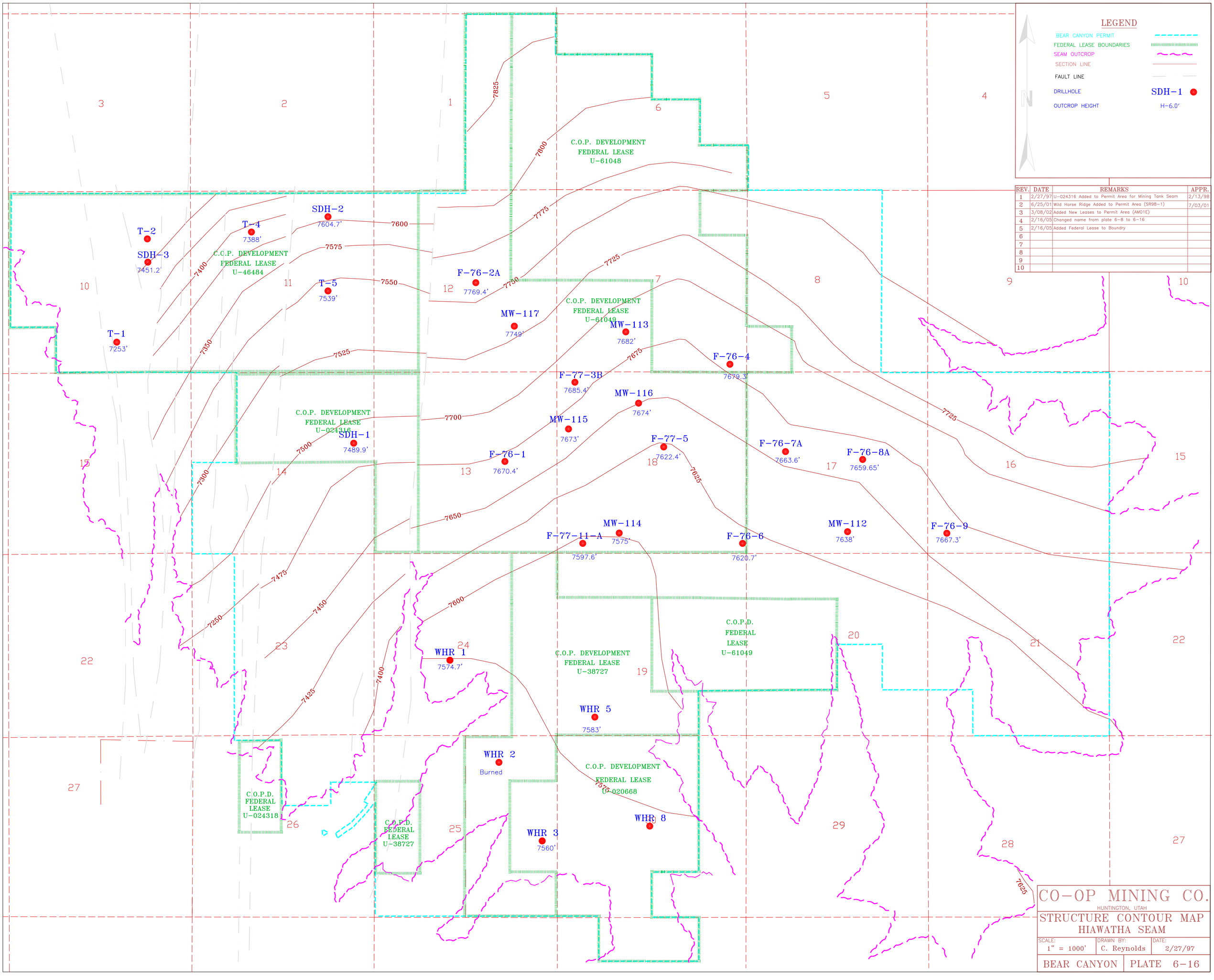
CO-OP MINING CO.
HUNTINGTON, UTAH

ISOPACH MAP
HIAWATHA SEAM

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. Reynolds	2/27/97

BEAR CANYON | PLATE 6-15



REV.	DATE	REMARKS	APPR.
1	2/27/97	U-024316 Added to Permit Area for Mining Tank Seam	2/13/98
2	6/25/01	Wild Horse Ridge Added to Permit Area (SR98-1)	7/03/01
3	3/08/02	Added New Leases to Permit Area (AM01E)	
4	2/16/05	Changed name from plate 6-8 to 6-16	
5	2/16/05	Added Federal Lease to Boundry	
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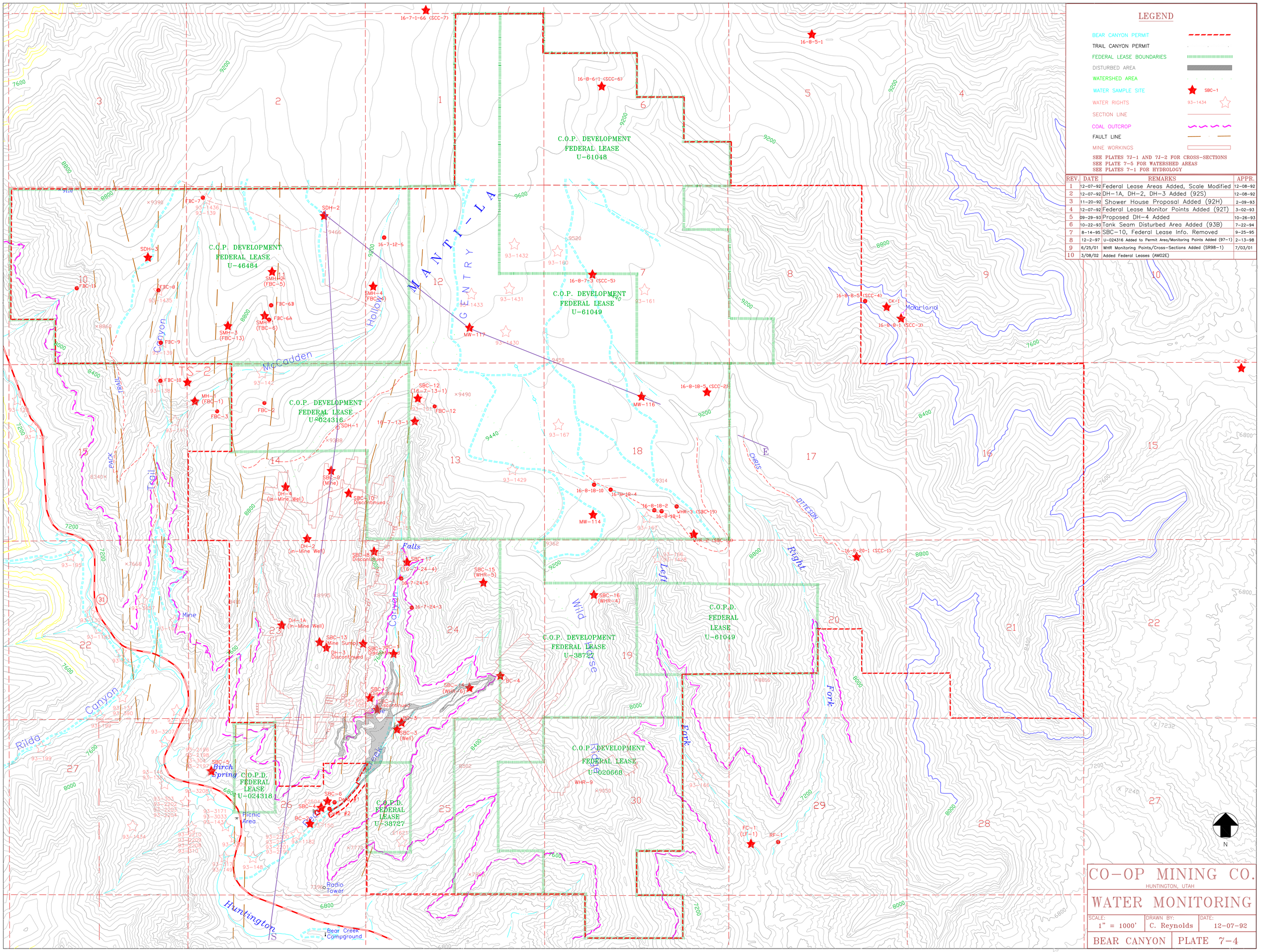
CO-OP MINING CO.
HUNTINGTON, UTAH

STRUCTURE CONTOUR MAP
HIAWATHA SEAM

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. Reynolds	2/27/97

BEAR CANYON | PLATE 6-16



LEGEND

- BEAR CANYON PERMIT
- TRAIL CANYON PERMIT
- FEDERAL LEASE BOUNDARIES
- DISTURBED AREA
- WATERSHED AREA
- WATER SAMPLE SITE — SBC-1
- WATER RIGHTS — 93-1434
- SECTION LINE
- COAL OUTCROP
- FAULT LINE
- MINE WORKINGS

SEE PLATES 7J-1 AND 7J-2 FOR CROSS-SECTIONS
SEE PLATE 7-5 FOR WATERSHED AREAS
SEE PLATES 7-1 FOR HYDROLOGY

REV.	DATE	REMARKS	APPR.
1	12-07-92	Federal Lease Areas Added, Scale Modified	12-08-92
2	12-07-92	DH-1A, DH-2, DH-3 Added (92S)	12-08-92
3	11-20-92	Shower House Proposal Added (92H)	2-09-93
4	12-07-92	Federal Lease Monitor Points Added (92T)	3-02-93
5	09-29-93	Proposed DH-4 Added	10-26-93
6	10-22-93	Tank Seam Disturbed Area Added (93B)	7-22-94
7	8-14-95	SBC-10, Federal Lease Info. Removed	9-25-95
8	12-2-97	U-024316 Added to Permit Area/Monitoring Points Added (97-1)	2-13-98
9	6/25/01	WHR Monitoring Points/Cross-Sections Added (SR98-1)	7/03/01
10	3/08/02	Added Federal Leases (AM02E)	

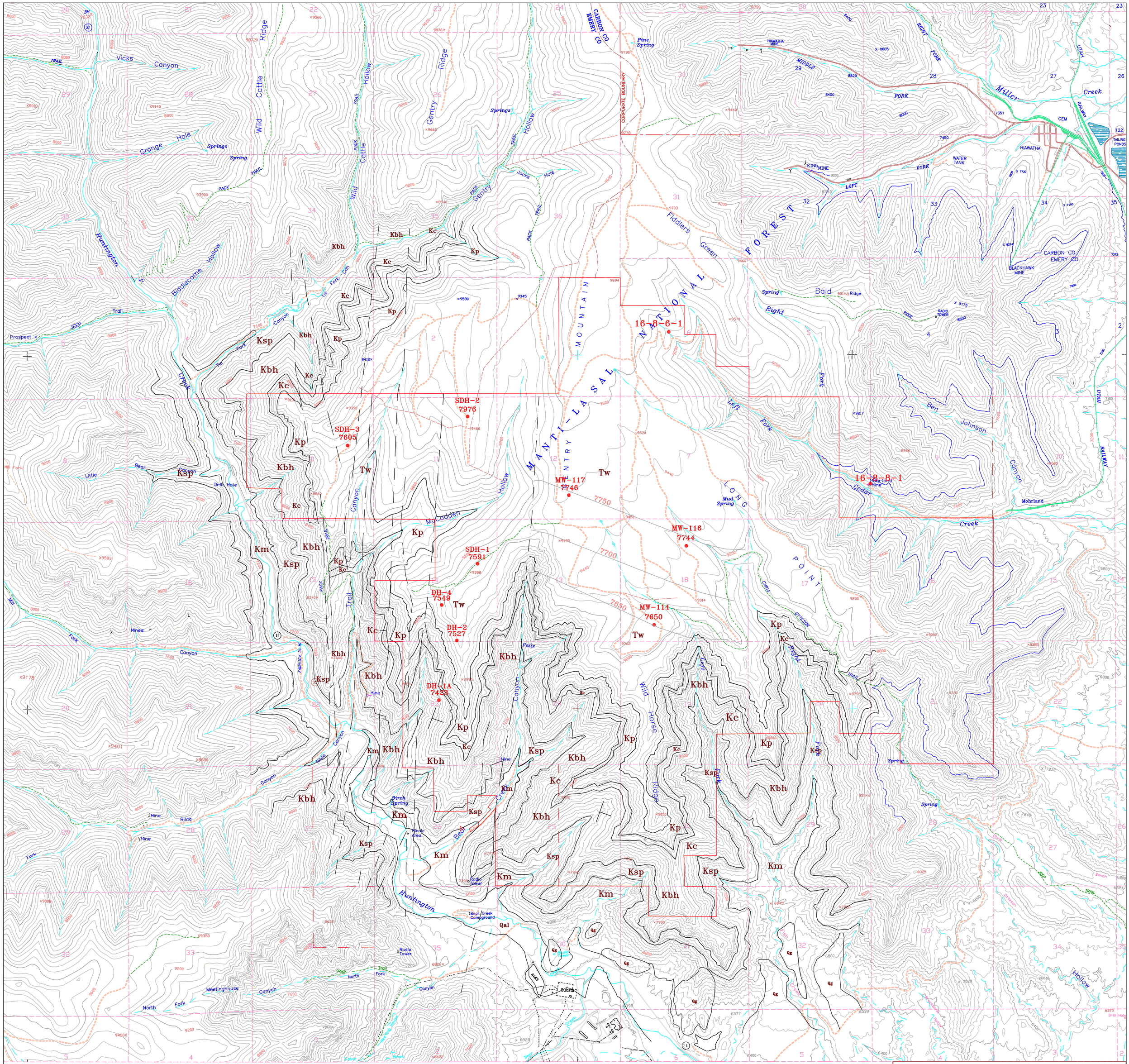
CO-OP MINING CO.

HUNTINGTON, UTAH

WATER MONITORING

SCALE:	DRAWN BY:	DATE:
1" = 1000'	C. Reynolds	12-07-92

BEAR CANYON | PLATE 7-4



REV.	DATE	REMARKS	APPR.
1	3/08/02	Added Federal Leases (AM01E)	
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N

Legend

Permit Boundary Line

Surface Monitor Well

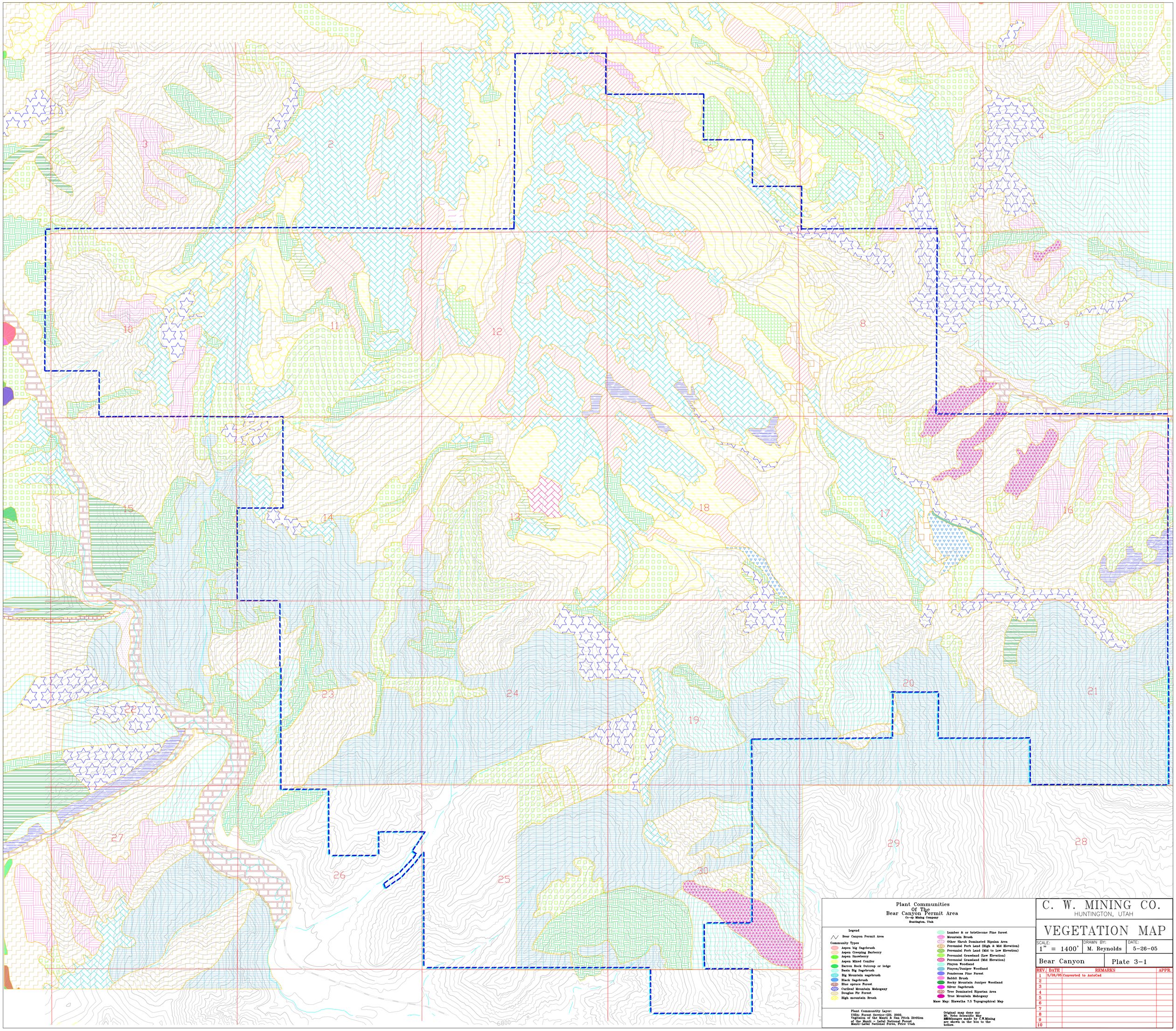
CO-OP MINING CO.

HUNTINGTON, UTAH

SPRING CANYON POTENTIOMETRIC SURFACE

SCALE:	DRAWN BY:	DATE:
1" = 2000'	C. Reynolds	6/25/01

BEAR CANYON | PLATE 7-4A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28
29
30
6800
Plant Communities
Of The
Bear Canyon Permit Area
Co-op Mining Company
Huntington, Utah
Legend
Bear Canyon Permit Area
Community Types
Aspen big Sagebrush
Aspen Creeping Barberry
Aspen Snowberry
Aspen Mixed Conifer
Barren Rock Outcrop or ledge
Basin Big Sagebrush
Big Mountain sagebrush
Black Sagebrush
Blue spruce Forest
Curlleaf Mountain Mahogany
Douglas Fir Forest
High mountain Brush
Lumber & or bristlecone Pine forest
Mountain Brush
Other Shrub Dominated Riparian Area
Perennial Forb Land (High & Mid Elevation)
Perennial Forb Land (Mid to Low Elevation)
Perennial Grassland (Low Elevation)
Perennial Grassland (Mid Elevation)
Pinyon Woodland
Pinyon/Juniper Woodland
Ponderosa Pine Forest
Rabbit Brush
Rocky Mountain Juniper Woodland
Silver Sagebrush
Tree Dominated Riparian Area
True Mountain Mahogany
Base Map: Hiawatha 7.5 Topographical Map
Plant Communtity Layer:
USDA Forest Service-GIS, 2002.
Vegtaion of the Manti & San Pitch Divition
of the Manti - LaSal National Forest
Manti-LaSal National Fores, Price Utah
Original map done my
Mt. Nebo Scientific May
2005changes made by C.W.Mining
are shown in the box to the
bellow.
C. W. MINING CO.
HUNTINGTON, UTAH
VEGETATION MAP
SCALE: 1" = 1400'
DRAWN BY: M. Reynolds
DATE: 5-26-05
Bear Canyon
Plate 3-1
REV. DATE REMARKS APPR.
1 5/26/05 Converted to AutoCad
2
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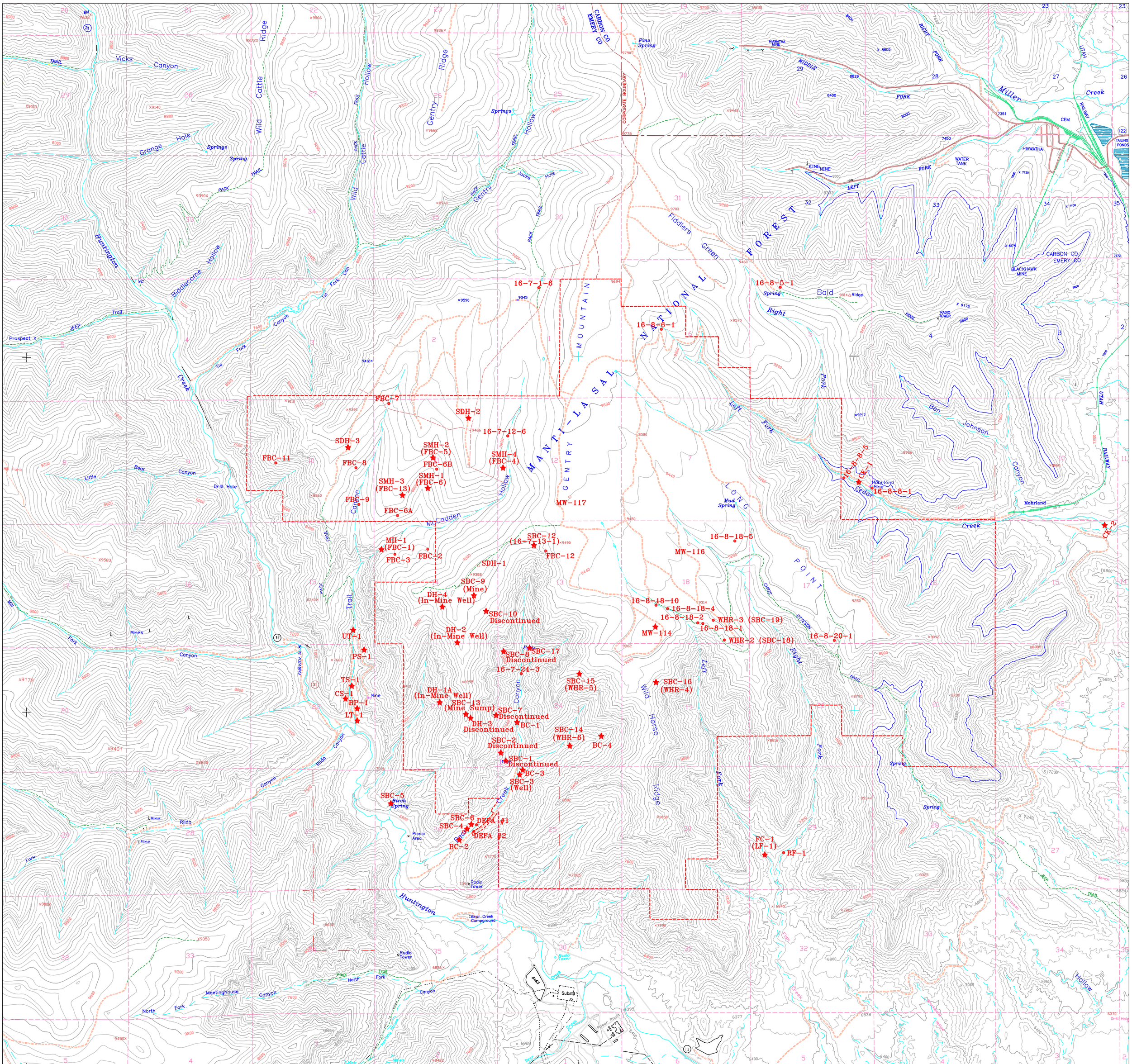

REV.	DATE	REMARKS	APPR.
1	6-25-01	WHR Monitoring Points Added (SR98-1)	7-03-01
2	6-25-01	Permit Area Increased (AM02E)	
3	2-16-05	Added water monitoring sites	
4			
5			
6			
7			
8			
9			
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N

Legend

- Permit Boundary Line
- Water Sampling Location
- Surface Monitor Well

CO-OP MINING CO.

HUNTINGTON, UTAH

WATER SAMPLING LOCATIONS

SCALE:	DRAWN BY:	DATE:
1" = 2000'	C. Reynolds	10/28/97

BEAR CANYON | PLATE 7N-2