308 --- Q199609200002
Scientific Notebook #21:
Analogs Field Notebook

RECORD

Endfish Pearcy

CNWRA
CONTROLLED
COPY 21

E. C. Pearcy
2/23/91

Pages 1 through 43 of this Scientific Notebook were reviewed for compliance with QAP-001 in response to Corrective Action Request 94-02. Corrections and clarifications were made as appropriate. In some cases, the date of a change will reflect the date of this review rather than the date of the original Scientific Notebook entry.

Randy Fedor
SwRI-QA
10/14/94

KMJames 7/26/95 Kristi Meyer-James

150 US 400 TC

2/23/91

Field trip to Peña Blanca, Mexico

Information to be recorded for each sample:

- ID No.
- location of site ECP 2/25/91
- Name & age of ~~host~~ rock sampled (if known)
- Date of collection
- Brief description of sample
- Name or initials of person making entry

ALSO:

- photo, if necessary
- sketch, if necessary
- location marked on map, as necessary

→ All above in accordance w/ TOP-06

ECP

Sample ID No.'s as:

MAR - WMM - 1

↑ Abbreviated Location Name

↑ initials of Collector

↑ sequential Number for site

ECP
2/23/91

2/24/91

On this trip are: Bill Murphy
Ron Green
English Penny
ECP Phillip Goodell

TODAY (2/24/91) we flew from San Antonio to El Paso, where we met P.C. Goodell. Then we drove from El Paso to Chihuahua, in a UTEP van.

2/25/91 ECP

→ Go to Chih. Univ.
meet F. Javier Altamirano R.
Adolfo Chavez
Ignacio Reyes

TALK with them about Project + logistics

ECP 8/25/94

→ Go to the
"Fideicomiso de Fomento Minero"
meet: C.
Guillermo Rose Gomez
= head of the local office
- We have permission to go to Peña Blanca and to take samples.
- Much information is available (core logs, maps, reports) but it is disorganized and housed in several warehouses.
- Not readily available
- Rose's permission hinges largely on our association with "Nacho" Reyes and his doctoral work
- Nacho understands that such cooperation may not actually work out.

Also met: Jorge Chacón a Fomento metallurgist, who would help sort out any information we might need from the warehouses.

→ Go to the Government Map Store

→ purchase geologic and topographic maps of the Peña Blanca Area

- tried to blow up a topo map for use as a sample location base map (by xerox) but failed due to machine troubles.

ECP 2/25/91

→ Go to the Consejo Recursos Minerales

- meet Enrique Guzman = head of the local office

- permission for this visit and for preliminary investigations obtained easily

- again much mapping sections, cores + logs potentially available

- Altamirano used to head the Consejo and was able to leverage "borrowing" of 14 maps & 1 section for our use

in the field. 2/25/91 ECP

2/25/91 ECP

LANDSAT PE-22164-16530-7
25 DEC 80

N28-46/W105-42
USGS-EDC N N28-46/W105-42N
7 D SUN EL 29 A145 S3H-CP-NL7

THESE ARE THE ID CODES FROM A B+W LANDSAT IMAGE OF THE Peña Blanca Area.

- After lunch we dropped some maps off to be copied and went off up into the SANTA EULALIA Ag-Pb-Zn district for a regional overview.

ECP 8/25/94

2/26/91 1ST Field visit to Peña Blanca District

→ RAINING! even though this is not the rainy season (July - August)

→ Exploration de Peña Blanca began in 1965 w/ airborn radiometric surveys

ref = J. ALTAMIRANO

⇒ 1ST stop on road below the Puerto I deposit

→ Diabase Dike cutting the CORRALES FM

samples:

PUE 1 - ECP - 1

- located below Puerto I deposit just off road to south

ECP 2/26/91 - Corrales FM ~51 my old

Roll 1 - PHOTO of Dike/corrales contact

- PHOTO of corrales FM showing alteration associated with fractures

- 2/26/91
- red, well-welded silicic volcanic
- ECP

sample: PUE 1 - ECP - 2A 6/25/91 ECP "A"

- same location as last sample
- Diabase dike in the Corrales FM
- 2/26/91
- weathered diabase
- ECP
- NO DATE/AGE available

3/20/92 ECP AN ADDITIONAL sample of the SAME MATERIAL was collected on 3/4/92 by L. KOVACH.

- PHOTOS TAKEN of BOTH samples
- Locations ECP 2/26/91 MARKED on topo map as loc. #1

⇒ 2ND STOP LEVEL 0 of the NOPAL I MINE

sample NOPI - ECP - 1

- HIGH grade U ore probably pitchblende and other U minerals
- location is in the level 0 ADIT of the NOPAL I mine AT END OF 1ST ADIT TO RIGHT
- 2/26/91 ECP
- NO AGE on sample AVAILABLE
- HOST IS THE NOPAL FM NEAR THE CONTACT w/ THE COLORADAS FM
- PHOTOS TAKEN

⇒ 3RD STOP 2/26/91
MARGARITAS MINE

sample : MAR - ECP - 1
- located in "Cesium Pit" at MARGARITAS
- PHOTO TAKEN
- 2/26/91 ECP
- URANOPHANE crust on fracture in the Pelloncillos FM
- NO AGE AVAILABLE

SAMPLE MAR-ECP-2 2-26-91
noted by MURPHY WWW

Vein material possibly calcite with yellow uranium mineralization collected from ore dump from end of Puerto 3 upper incline. Dump located above Margaritas Pit.

ECP 8/25/94

⇒ 4th STOP 2/26/91
- NOPAL I HIGH GRADE ore Piles 6/25/91
- sample NOP I - ECP - 2A ECP "A"
  - ~20 Kg/ton U ore
  - we picked up the highest GRADE AVAILABLE
  - ECP

2/27/91
⇒ 5th STOP Puerto I SHAFTS & Dumps 6/25/91
sample : PUE 1 - ECP - 2B ECP "B"
- ECP 2/27/91
- one sample from dumps below trenches
- photo taken of me writing this
- weeksite MAY be replacing the Feldspar phenocrysts ECP 2/27/91
- in the ~~ESCUADRA~~ FM
  AGE NOPAL FM
  ↳ = 44 Ma
- location MARKED on MAP

6th Stop

Entry by Murphy 2-27-91 WM

Samples collected from talus at base of cliff in Mesa formation east of sample location #1

Three samples

MESA-ECP-1, 2, 3

1: Brown vitrophyre from base of Mesa, undevitrified

2: Reddish devitrified variation of 1. from above 1

3: Gray brown welded tuff from above 2 stratigraphically

All are densely welded, with phenocrysts.

Location marked by #6 on topo map.

Sample PB-ECP-1

Sample collected from Peña Blanca formation immediately below Mesa formation at location noted above. Pink friable material was broken away to access fairly hard pumice fragment rich samples which were collected. Fractures in the Peña Blanca contain calcite, manganese oxides (some with beautiful dendrites) and yellow uranium(?) mineralization (no gamma signal from yellow mineral)

WM 2-27-91

Similar material nearby had significantly fewer pumice fragments.

7th stop

Two wells marked roughly on topo map. → Water depth > 200 feet. A rock dropped in each hits water after a long bouncing fall (~6 seconds in one case).

[measured by tape weighted] ECP 2/27/91

WM 2-27-91

8th Stop → [LARGE WASH] ECP 2/27/91

Boquilla Colorada Canyon with cliffs of Nopal formation, and further along downstream the Colorado formation is exposed. Both are cut by veins with bleached zones cm's to dm's wide. These are particularly attractive in the stream bed in the Colorado where the pink rock is bleached white. Goodell has published chemical data on the fresh and altered Colorado as ECP 2/27/91

Samples taken Colorados ECP 2/27/91

NOP-ECP-1

COL-ECP-1

NOP-ECP-1 is a collection of relatively fresh gray tuff samples

WM 2-27-91

COL-ECP-1 is a collection of pink and white, fresh and altered tuff samples 2/27/91

2/28/91 ECP

- We will spend most of the day at NOPAL I, as it appears to be the most promising analog site.

- OBSERVED ALTERATION TYPES INCLUDE:
  - late Mn-stained fractures
  - the District-wide BLEACHED veinlets which are best developed in the COLORADAS FM.

→ both of the above appear to be later than the primary mineralization at NOPAL I based on the occurrence of bleached areas within the high-grade, level 0 adit face

Samples: 6/25/91 ECP "B"

→ - NOPI-ECP-2B
- collected from talus pile at base of level 0 adit, about 10-15 m from the adit, to the right (ie to the North) as you face the adit
- sample is of a silicified, brecciated portion of the base of the NOPAL Fm, has abundant Fe-oxy/hydroxides with a gossan-like appearance
- NO AGE KNOWN
- location of NOPAL I MARKED on TOPO SHEET
- 2/28/91 ECP

→ NOPI-ECP-3
- collected from NEAR ENTRANCE to the level 0 adit, from rib base on left hand side about 2 m into the adit
- sample is an altered version of NOPI-ECP3, the host breccia appears to be altered to clays, the iron oxides are altered and there are crusts and veins of a bright yellow U mineral which may be meta-autunite
- NO AGE KNOWN, ECP
- location MARKED on TOPO sheet, 2/28/91

MOST ROCK FOR NOPI-ECP-M IS THE BASE OF THE NOPAL FM.

SAmple: NOPI - ECP - 4
- collected from base of cliff face to the right of level 0 ADIT some 10-15 m, just above the talus pile from which NOPI-ECP-2 was collected
- NOPI - ECP-2 fell from above where NOPI - ECP - 4 was collected (about 7 m)
- sample NOPI - ECP - 4 ~~is A~~ ECP 2/28/91 may be a strongly altered version of NOPI - ECP - 2
- NO AGE KNOWN
- HOST is the BASE of the NOPAL FM
- LOCATION of NOPAL I is MARKED on the TOPO sheet
- 2/28/91 ECP

SAMPLE: NOPI - ECP - 5
- collected from outcrop of COLORADAS FM AT THE North END of ~~the~~ ECP 2/28/91 level 0, just south of where the level is covered by Dump material
- this sample of COLORADAS FM HAS the same bleached veinlets as seen yesterday some kilometers away in the large gully

- this sample NOPI - ECP - 5 looks very much like sample COL - ECP - 1
- location of NOPAL 1 is MARKED on the TOPO sheet
- AGE is NOT KNOWN
- 2/28/91 ECP

NOTE: AT NOPAL I level 0, ABOUT 30 m east of ADIT ENTRANCE, ABOUT 4' ABOVE Ground surface, read ABOUT 2,000 cps gamma scintilacty with a Geometrics mode ~~GR-101A~~ ECP 2/28/91 ECP 2/28/91

GR - 101A

SAMPLE: NOPI - ECP - 6
- collected on LEVEL +10 ABOVE the ADIT AT level 0, from one of the most KAOlinitic "Il Defense pits"
- clay alteration of NOPAL FM; MAY correspond to the bleached veins seen below
- HOST is NOPAL FM
- AGE UNKNOWN
- LOCATION MARKED on TOPO MAP, OF NOPAL I 2/28/91 ECP

Following notes in this hand by Murphy at Nopal I 2-28-91 William M Murphy / WMM

Attempt to sample and field characterize - categorize alteration types

NOPI-ECP-7
Nopal tuff with alteration pervasive in the mine area: rock is light purple; feldspar phenocrysts are chalky; lithophysae are coated or filled with hematitic/limonitic material. Surfaces of this sample also show late alteration and deposition of MnO dendrites.

NOPI-ECP-8
Bleached zones parallel to fractures that are frequently with a thin calcite center vein. Margins of the bleached zones are sharp in contact with rock such as NOPI-ECP-8. A suite of specimens represent the bleached rock and the transition from bleached to unbleached.

NOPI-ECP-9
A variety of the bleached rock from a major vertical zone that is more intensely altered, apparently with abundant kaolinitization and silicification.

NOPI-ECP-10
Hematitic alteration associated with major subhorizontal fractures/faults. Some features show slickensides. This hematitic vein appears to be cut and therefore older than the major bleached zone of ECP-9. Some of the red alteration resembles jasper. Some small fragments with slickensides is collected with larger fragments from the (another) vein at a different location.

NOPI-ECP-7, 8, 9, and 10 were collected from the +10 meter level and from the wall above that level.

WMM 2-28-91

NOPI-ECP-11

Fragments from a large gossen-like block extracted from Nopal I and placed in dump between 0 level and -100 m level. Spheroidal hematite is well developed in these specimens. Other similar material from the breccia in the vicinity of the Nopal 0 level has possible ~~tennantite~~ pyrite pseudomorphs. The gossen-like rock resembles oxidized sulfide deposits.

WMM 2-28-91

WMM 2-28-91

NOP-ECP-2

Obsidian fragments from the basal Nopal vitrophyre collected from a hillside southwest of Nopal I (location 9 on map). Samples were excavated from below soil. They are black cm-scale chips with alterated phenocrysts and caliche on surfaces.

ESC-ECP-1

Relatively fresh Escuadra formation samples collected from site 10 marked on map between Margaritas workings and Nopal I. WMM 2-28-91

2/29/91 ECP

The following are notes made in a trip review meeting with RTG, WMM, PCG and ECP in the restaurant at La Victoria, Chihuahua, MEX.

- Bill has notes on available x-sections, maps and core from the 1ST meeting with Altamirano and N. Reyes.

- P.C.G. has not actually identified a realized horizon at any of the mines at Peña Blanca.

- If main interest is in NOPAL I, will we deal only with the Cangejo? ANS. = Not clear

3/4/91 ECP 9:00 AM meeting with L. KOVACH, JLR, WMM, ECP

ECP 8/25/89

Natural An

ID Code	Description	Reference	Collection Date	Initial Log Entry Date	Entry by	Storage Location	Collection Site	Collector
PUE1-ECP-1 PUE1-ECP-1-TS1 PUE1-ECP-1-TS2	reddish, welded tuff, Corralos Fm. standard thin section by Mineral Optics Laboratory standard thin section by Mineral Optics Laboratory	ECP Field Notebook-CNWRA #21, p.6	2/26/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
PUE1-ECP-2	diabase dike in the Corralos Fm.	ECP Field Notebook-CNWRA #21, p.7	2/26/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
NOP1-ECP-1	high grade reduced U ore from adit, base of Nopal Fm.	ECP Field Notebook-CNWRA #21, p.7	2/26/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
MAR-ECP-1	uranophane crust in Pelancillos Fm.	ECP Field Notebook-CNWRA #21, p.8	2/26/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
MAR-ECP-2	calcite (?) with yellow U staining	ECP Field Notebook-CNWRA #21, p.8	2/26/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	WMM
NOP1-ECP-2	high grade oxidized ore from dump	ECP Field Notebook-CNWRA #21, p.9	2/26/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
PUE1-ECP-2	weeksite replacing feldspar in Nopal Fm.	ECP Field Notebook-CNWRA #21, p.9	2/27/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
MESA-ECP-1 MESA-ECP-1-TS1 MESA-ECP-1-TS2	brown vitrophyre, Mesa Fm. standard thin section by Mineral Optics Laboratory standard thin section by Mineral Optics Laboratory	ECP Field Notebook-CNWRA #21, p.10	2/27/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
MESA-ECP-2 MESA-ECP-2-TS1 MESA-ECP-2-TS2	reddish devitrified vitrophyre, Mesa Fm. standard thin section by Mineral Optics Laboratory standard thin section by Mineral Optics Laboratory	ECP Field Notebook-CNWRA #21, p.10	2/27/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
MESA-ECP-3 MESA-ECP-3-TS1 MESA-ECP-3-TS2	gray/brown welded tuff, Mesa Fm. standard thin section by Mineral Optics Laboratory standard thin section by Mineral Optics Laboratory	ECP Field Notebook-CNWRA #21, p.10	2/27/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
PB-ECP-1 PB-ECP-1-TS1 PB-ECP-1-TS2	pink, friable tuff, Peña Blanca Fm. standard thin section by Mineral Optics Laboratory standard thin section by Mineral Optics Laboratory	ECP Field Notebook-CNWRA #21, p.10	2/27/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
NOP-ECP-1 NOP-ECP-1-TS1 NOP-ECP-1-TS2	fresh, unaltered, gray tuff, Nopal Fm. standard thin section by Mineral Optics Laboratory standard thin section by Mineral Optics Laboratory	ECP Field Notebook-CNWRA #21, p.11	2/27/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
COL-ECP-1 COL-ECP-1-TS1 COL-ECP-1-TS2	fresh and altered tuff, Colorados Fm. standard thin section by Mineral Optics Laboratory standard thin section by Mineral Optics Laboratory	ECP Field Notebook-CNWRA #21, p.12	2/27/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
NOPI-ECP-2	brecciated tuff with Fe-oxides, Nopal Fm.	ECP Field Notebook-CNWRA #21, p.13	2/28/91	3/26/91	ECP	Building 57	Peña Blanca, Mex.	ECP
NOPI-ECP-3	oxidized U mineralization, uranophane and etc.	ECP Field Notebook-CNWRA #21, p.13	2/28/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
NOPI-ECP-4 NOPI-ECP-4-TS1 NOPI-ECP-4-TS2	strongly altered tuff standard thin section by Mineral Optics Laboratory standard thin section by Mineral Optics Laboratory	ECP Field Notebook-CNWRA #21, p.14	2/28/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
NOPI-ECP-5	reddish tuff with bleached veinlets	ECP Field Notebook-CNWRA #21, p.14	2/28/91	3/25/91	ECP	Building 57	Peña Blanca, Mex.	ECP
NOPI-ECP-6	kaolinized tuff from level +10 Nopal	ECP Field Notebook-CNWRA #21, p.15	2/28/91	3/26/91	ECP	Building 57	Peña Blanca, Mex.	ECP
NOPI-ECP-7 NOPI-ECP-7-TS1 NOPI-ECP-7-TS2	lightly altered Nopal Fm. tuff standard thin section by Mineral Optics Laboratory standard thin section by Mineral Optics Laboratory	ECP Field Notebook-CNWRA #21, p.16	2/28/91	3/26/91	ECP	Building 57	Peña Blanca, Mex.	ECP & WM
NOPI-ECP-8 NOPI-ECP-8-TS1 NOPI-ECP-8-TS2	Nopal Fm. with bleached veinlets standard thin section by Mineral Optics Laboratory standard thin section by Mineral Optics Laboratory	ECP Field Notebook-CNWRA #21, p.16	2/28/91	3/26/91	ECP	Building 57	Peña Blanca, Mex.	ECP & W
NOPI-ECP-9	intensely altered tuff, Nopal Fm.	ECP Field Notebook-CNWRA #21, p.17	2/28/91	3/26/91	ECP	Building 57	Peña Blanca, Mex.	ECP /
NOPI-ECP-10	hematitic, silicified vein with slickensides	ECP Field Notebook-CNWRA #21, p.17	2/28/91	3/26/91	ECP	Building 57	Peña Blanca, Mex.	ECP
NOPI-ECP-11	Fe-oxide gossan, ore block from Nopal I	ECP Field Notebook-CNWRA #21, p.18	2/28/91	3/26/91	ECP	Building 57	Peña Blanca, Mex.	
NOP-ECP-2 NOP-ECP-2-TS	obsidian remnants from basal Nopal vitrophyre standard thin section by Mineral Optics Laboratory	ECP Field Notebook-CNWRA #21, p.18	2/28/91	3/26/91	ECP	Building 57	Peña Blanca, Mex.	
ESC-ECP-1 ESC-ECP-1-TS1 ESC-ECP-1-TS2	fresh lithic tuff, Escuadra Fm. standard thin section by Mineral Optics Laboratory standard thin section by Mineral Optics Laboratory	ECP Field Notebook-CNWRA #21, p.18	2/28/91	3/26/91	ECP	Building 57	Peña Blanca, Mex.	

McDermitt, NEVADA

4/17/91

Scott SHADY Ct. Motel
Winnemucca, NV

ECP 8/25/94

- Discussion w/ S. CASTER 9:00 pm
  - McD really just one large caldera, not many as J.J. Rytuba
  - Rx: 15-16 MYA

ECP 8/25/94 4/18/91 1ST Stop just S. of CHEVRON Intersection 51

4/18/91 @ Moonlight Face
- breccia appears hydrothermal
  - some areas of clasts appear to be matrix supported

ECP 8/25/94
- no U minerals are visible, primary or secondary

9/24/91 NOPAL I
2ND Visit ECP

→ We drove in from the East side as far as the road allowed then hiked ~ 3 km to Nopal.

→ Stop 1 with WMM (= Bill Murphy) at -100 m Adit opening and nearby trenches. All rock surfaces appear dry despite having had the heaviest rains of the year in the last few weeks.

→ background radiation here is essentially 0 mrem/hr, only a few random clicks.

→ all rocks in this area (Tco = host) are without radiation above background.

Thoughts on the paragenesis of veinlets and alteration at this location:

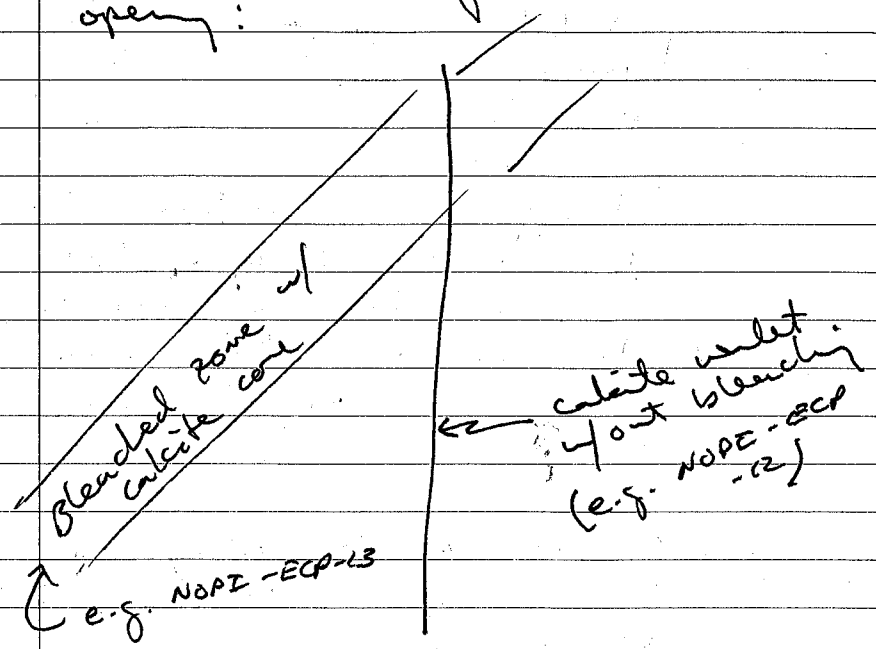
① veinlets with prominent bleached alteration rims and dark vuggy calcite fillings

② #1 above is cross cut here by calcite-filled veinlets (~ 1/2 cm wide)

NOTE It may be that the calcite

is the same calcite which simply followed available openings so that the calcite is later than the bleaching, but is the same calcite.

Sketch of South wall of "T" trench East of -100 m adit opening:

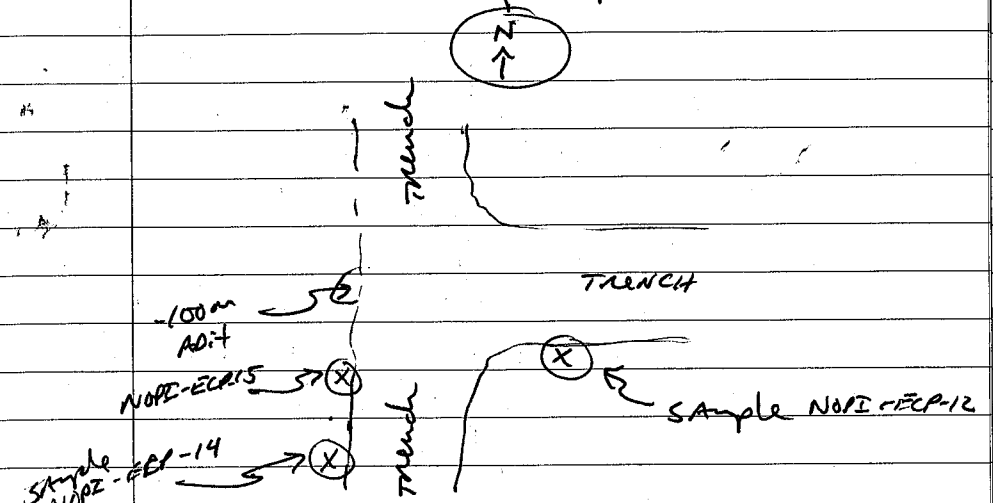


Bleached zones have diffuse margins.

Sample Numbering for this trip will begin with:

NOPI - ECP - 12

- S. wall of trench at -100m adit opening, plan view:



- T_{co} = Host Rock (= Tertiary Colorado Fm)
- 9/24/91 ECP/WMM
- Coarse (~ 1-4 mm) calcite crystals, vuggy texture in near vertical veinlet with v. minor bleached selvage; this veinlet cross cuts the prominent bleached zones.

NOPI - ECP - 13

→ approximately 3m EAST of NOPI - ECP - 12
- Tco = HOST ROCK
- 9/24/91 ECP / WMM

- calcite - filled veinlet from center of prominent bleached zone, calcite is dark colored, relatively coarse (1-3 mm) and vuggy, 2 calcite veinlets have a clay filling between which may probably have been silica or other phase, this appears to be a compound or sheeted ~~veinlet~~ ECP 9/24/91 veinlet.

NOPI - ECP - 14

- 9/24/91 ECP/WMM
- see sketch p25
- Tco = Host ROCK
- coarse, calcite veinlet with little or no bleached margin. Appears TO BE THE SAME as NOPI - ECP-12

NOPI - ECP - 15

→ Bleached zone of Tco near a veinlet @ Location p. 25
→ 9/24/91 ECP

NOPI - ECP - 16

→ red zone of Tco ~ 20cm from edge of Bleached zone of sample NOPI - ECP - 15
→ 9/24/ECP

NOTE @ 1:45 pm 9/24/91 my (ECP) dosimeter reads 8 mrem

→ WMM + ECP MADE A γ-count MAP of the Nopal I deposit. See WMM's notebook.

→ My Dosimeter 3:15 pm now reads 8 mrem. WMM's is going up faster than mine ⇒ there are poor indicators of dose.

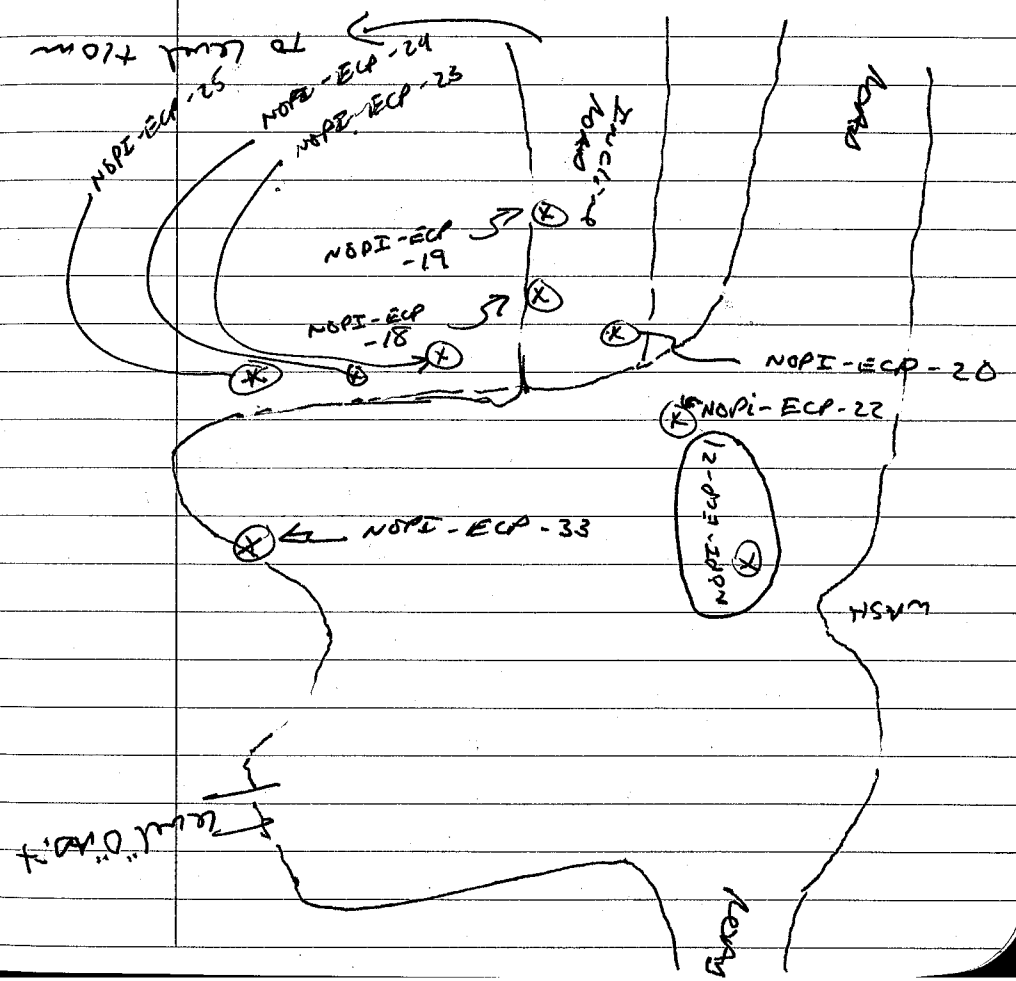
→ PCG (= Goodell) says UOx is only known from the area at Nopal I where I collected samples last time. THAT NO UOx is known from further in or deeper or from the surface.

NOTE PCG observed that grass ECP 9/24/91 is preferentially absent from the immediate area of the breccia pipe on the +10 m level surface.

9/25/91 ECP

→ Sampling today on the Nopal I levels 0 and +10 and surrounding. PCG is using the core drill to take samples for himself and possibly for us also from inside level 0 adit.

Sketch map of Level 0:



NOTE!

NOPI - ECP - 17 recorded in wMM notebook

NOPI - ECP - 18

- see location on p29.
- Tco = Host Rock
- 9/25/91 ECP
- symmetically banded / encrusted carbonate veinlet with minor (1-2 mm) bleached selvage, veinlet is ~ 0.5 cm wide w/ several layers of minerals.

NOPI - ECP - 19

- location on p29
- Tco = Host Rock
- 9/25/91 ECP
- coarse (~ 0.5 cm) carbonate crystals in a veinlet ~ 2cm wide w/ minor bleached selvage (~ 2-3 mm)
- collected ~ 3 m from NOPI - ECP - 18

NOPI - ECP - 20

- location on p.29
- Tco bleached veinlets and adjacent unbleached material from level 0m
- 9/25/91 ECP

NOPI - ECP - 21

- 9/25/91 ECP
- Tco = Host Rock
- symmetically mineralized carbonate veinlet in Tco with NO bleached selvage
- location on p.29

NOPI - ECP - 22

- location p.29
- Tco = Host Rock
- carbonate veinlet in Tco w/ NO bleaching

NOTE This veinlet clearly cross-cuts a bleached zone in the Tco and so is younger, the bleached zone has no mineralized core, only an empty fracture with symmetric bleaching.

→ the bleached zone cross cut by ECP-22 is ~ 6" wide.

NOPI - ECP - 23

- 9/25/91 ECP
- see ~~locations~~ ECP 9/25/91
- see location on p. 29
- carbonate veinlet in altered vitrophyre at the base of the Nopal Fm (= Tn)
- MAY have a bleached margin, hard to tell in the clay alteration

NOPI - ECP - 24

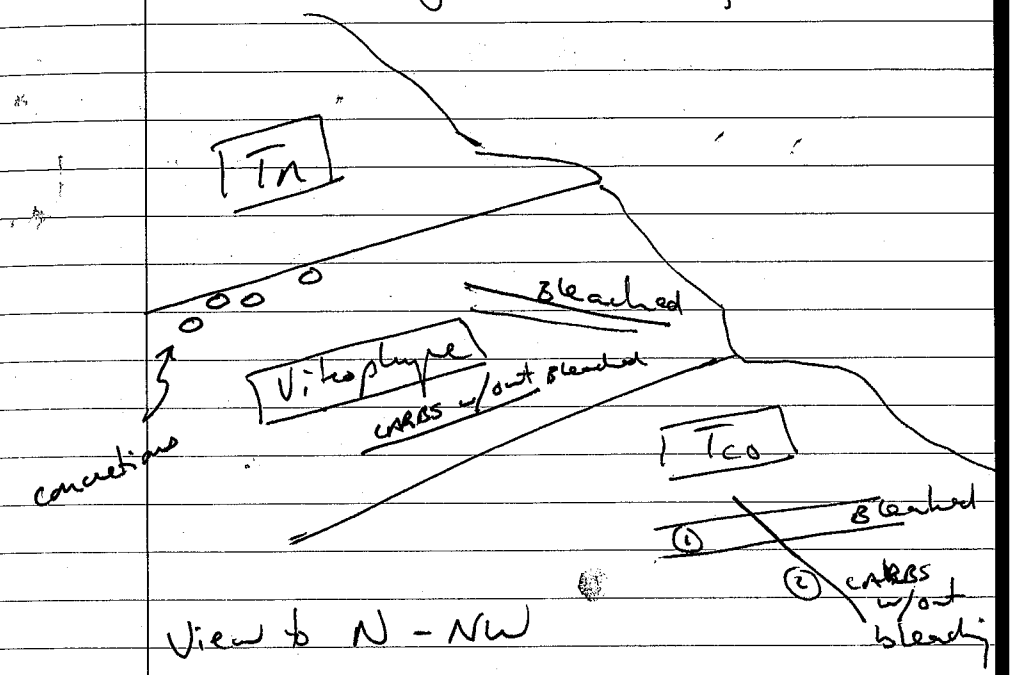
9/25/91 ECP
- location on p. 29
- SAME as ECP-23 from a diff location about 3m away, also within the altered vitrophyre

NOPI - ECP - 25

- location on p. 29
- 9/25/91 ECP
- a concretion of clay with core filled by green and red clays (zeolites? + FeOx?)
- these occur at the junctue between the top of the altered vitrophyre and the

bottom of the welded tuff of the Tn formation.

Sketch of vitrophyre relations:



View to N - NW

→ The bleached zones extend up from -100 m level through the Tco, through the vitrophyre, and into the Tn

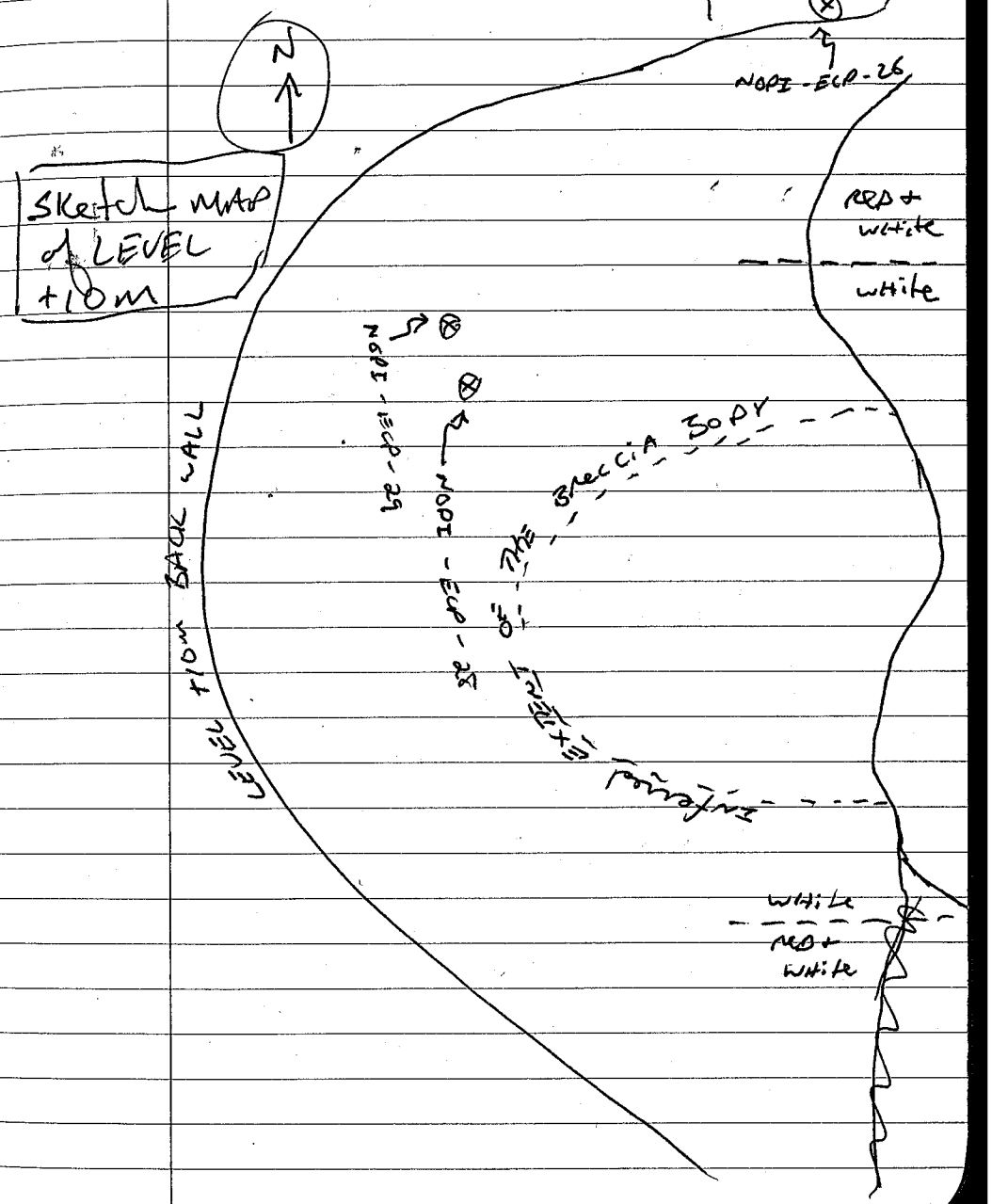
→ The carbonate veinlets extend at least from the -100 m level up into the vitrophyre, not clear if they go up into the Tn.

→ WALKING along the Tn outcrop just above the vitrophyre at the N. NW end of level 0: the fractures with bleached zones appear to merge with completely bleached Tn as the breccia pipe is approached.

⇒ if so, that suggests that the bleaching fluids are related to or came from the breccia body (?)

9/26/91 ECP

→ TODAY will be spent largely on level +10m looking at alteration and veining.



NOPI-ECP-26

- 9/26/91 ECP
- location on p.35
- Tn formation with bleached zones

NOTE It is clear that the bleached portion of the host rock becomes more and more abundant as the ore body is approached until (~10m out from the breccia pipe) the host rock is bleached entirely white

→ no crosscutting relations observed on +10 bet. calcite veins and the bleaching.

→ calcite veins do occur on level +10 and in the level +10 high wall, here they are coarse-grained and dark colored as they are below

NOTE!

It is possible that the Fe-Mn rich veins within the ore body are the remnants of Fe+Mn left after acid alteration removed the carbonate leaving FeO_x and MnO_x veinlets + gossan-like masses, if so, then have 3 stages!

1. bleached veins
2. calcite-filled fractures which x-cut the bleached veins
3. acid removal of the calcite from the ore of the ore body leaving the FeO_x + MnO_x behind.

NOPI-ECP-27

in UMM notebook

→ is caliche from Nopal I hill top.

NOPI-ECP-28

→ 9/26/91 ECP

→ location on p.35

→ calcite veinlet in ALTERED Tn

NOPI - ECP - 29

- 9/26/91 ECP
- location on p.35
- calcite veinlet along slickenside surface in Tn formation, slicks are near horizontal with N60° E orientation of lineation, strike ~ ⊥ to lineation, Dip ~ 2° NE

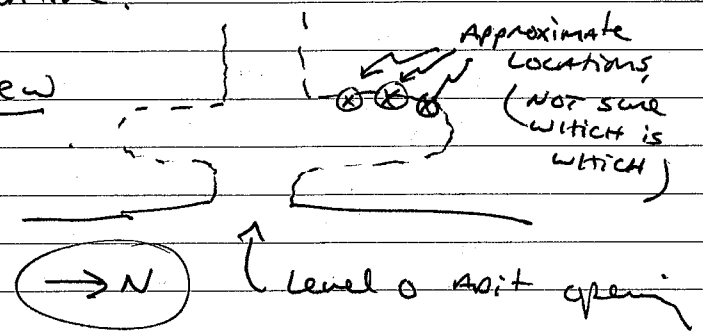
→ PCG AND CASTALLO MOLINA (CM) used the drill AND HAMMER + CHISEL to TAKE samples of the high grade ore from the level 0 ADit THESE will be samples:

NOPI - ECP - 30 AND

NOPI - ECP - 31 (Approximately 2 ft. apart)

Location:

PLAN View



- sampled by PCG + CM 9/26/91
- High grade UO_x and U_{sil} ore from breccia pipe within the Tn host.

NOPI - ECP - 32

SAME AS NOPI - ECP - 30 & 31 but collected by PCG with HAMMER + chisel ~ 2-3 ft. AWAY from 30 & 31

Miscellaneous thoughts

Ideas for papers/reports:

→ composition (mineralogy) and internal paragenesis of carbonate veins over 110m vertical interval

→ fluid inclusion data from the carbonate veinlets over 110m vertical interval

→ comparison of carbonate veinlets to FeOx-MnOx veinlets to establish if the Oxide veinlets are the product of acid alteration of precursor carbonate veinlets

→ composition of red Tr and Tco versus bleached Tr and Tco elements ±, mineralogic changes, is the major alteration associated with the Nopal I orebody. Is well-zoned around the ore. Compare w/ Ildephone notes

→ for GSA note PCG also sees fourmerite and/or vandrieshinite in the UO_x alteration assemblage.

9/27/91 ECP

NOPI-ECP-33

- 9/27/91 ECP
- Loc. on p. 29
- Tr = host rock
- FeOx/MnOx veinlets in highly kaolinized Tr, these samples taken to test the idea that they may be the acid-altered remnants of the carbonate veinlets seen elsewhere

→ Hiked up the Nopal I cut face walking along each level. On each level, the same red/white bleaching can be clearly seen, all the way to the top. Though the appearance of the fresh Tr at the very top is somewhat different from that lower down: the color is less red and there are abundant ~ horizontal

fractures with alteration along them.

NOPI - ECP - 34

- 9/27/91 ECP
- collected from the highest cut on the Nopal I face
- relatively fresh unaltered Tn with a different appearance from lower in the section, as noted above.

NOPI - ECP - 35

- 9/27/91 ECP
- collected from the highest cut on the Nopal I face, ~ 3 m away from ECP-34.
- this sample is bleached, clay-altered Tn, does not appear to be the SAME bleaching as the red/white alteration. may be weathering or may be other hydrothermal alteration

NOPI - ECP - 36

- 9/27/91 ECP
- fresh, unaltered Tn from top of cuesta North of Nopal I

NOTE AS I WALKED up here, the occurrence of the red/white alteration in the Tn decreased, AT AND near the top, I see no evidence of any alteration of the Tn other than weathering.

ECP 5/23/95

ECP

5/23/95

I believe this is my 11th trip to Peña Blanca, to the Nopal I Analog Site. Participants:

E. C. Pearcy
J. D. Prikryl
D. A. Pickett
I. A. Reyes (UACH)

We arrived at the Nopal Camp at about 2:00 pm after a morning recovering 5 pieces of luggage from the airline, picking up a truck and a van, purchasing gasoline, cement, and food.

The entire region is very dry. I. Reyes says there has been "no rain" this year. All afternoon the wind has carried dense clouds of fine dust.

We have spent the first part of this afternoon completing Borehole 12 on Level +10 of the Nopal deposit. Details

ECP 5/23/95

of this work are recorded in DAVID Pickett's field Notebook (CNWRA No. 121) on PAGE 17 AND following.

5/23/95

We have been interested in the extent to which U transported along fractures at the Nopal I deposit MAY move out of the fracture AND be retained within the tuff MATRIX. We will collect samples from the vertical exposures Above Level +10 to study this possibility. Previously, we HAVE collected samples from the Level +10 surface itself (inside + outside the NOMINAL ore zone).

ECP 5/23/95

THESE ARE A SET of FRACTURE fillings AND ADJACENT WALL ROCK from A NEAR Vertical fracture set on THE High WALLS of the NOPAL I deposit, All ARE NOPAL TUFF.

→ NOPI - 450 X, Y, Z
GRID LOCATION: -8 / 49 / 12.5
fracture filling, Hematite, KAOLINITE, MIXED iron oxyhydroxides

→ NOPI - 451
GRID LOCATION: -8 / 49 / 12.5
Tuff WALL ROCK ADJACENT to NOPI-450, SAMPLE APPEARS PARTIALLY ALTERED TO KAOLINITE, MINOR limonitic STAINING, SOME IRON OXIDE fracture filling ADHERES to SAMPLE FACE. FRACTURE FACE is INDICATED BY ARROWS DRAWN ONTO SAMPLE.

Now, MOVING UP onto Level +20 some SAMPLES Above the LAST two, but Along the SAME fracture set.
(PHOTO 9 BY D.A. Pickett)

5/23/95 ECP

→ NOPI - 452 X Y Z
GRID LOCATION: -10.5/54/23
- iron oxide fracture filling, some kaolinite

→ NOPI - 453
GRID LOCATION -10.5/54/23

tuff WALL ROCK including A portion of iron oxide fracture filling, AS before, ARROWS DRAWN onto the SAMPLES point to the fracture surface

5/24/95 ECP
TODAY, Jim Arikryl is collecting samples to extend the traverse through generally fractured tuff across the West margin of the Nopal I deposit AT 9.1 m N. DAVID Pickett is deploying additional radon detectors in the level too adit.

He AND I. Reyes will also look for exposures of the altered diatreme in the adit. I will continue sampling fracture fillings AND ASSOCIATED wall rock on up the vertical face of the deposit.

→ NOPI - 454 X Y Z
Grid Location -12/55.5/32
- Hematitic fracture filling, includes some fracture gouge, AT THIS point, I am only 6-8 m below the pre-mining surface

→ NOPI - 455
Grid Location -12/55.5/32
- NOPAL tuff wall rock immediately ADJACENT to fracture filling NOPI-454. THE TUFF is strongly altered to white clay, probably KAOLINITE, likely just surface weathering.

ECP 5/24/85

rock within AND close to the fracture zone is more heavily altered than rock further away. Looks like simple weathering with water moving preferentially down the ~ vertical fracture zone.

- As on earlier samples, arrows drawn on NOPI-455 point to the fracture surface.

I have now climbed to the top of the vertical face. Nopal tuff exposed at this highest level appears minimally weathered. It is still purple toned in color and most feldspars are crystalline. The strong "weathering" I observed along the vertical fracture zone does appear substantially limited to that zone, suggesting strong preferential fractured flow with local kaolinization, no calcite observed along that fracture

zone, only iron oxides and kaolinite.

	E	N	Vert.
→ NOPI-456	X	Y	Z
Grid Location	8	65	53

- fracture coating on sub horizontal fracture ~ 3/4 m below the pre-mining surface, appears to be calcite-caliche developed along a volcanic parting with earlier-formed euhedral quartz crystals and minor iron oxides.
→ can it be dated?

→ NOPI-457
Grid Location 0/60.5/44
→ caliche from subhorizontal fracture surface ~ 1 m below pre-mining ground surface

→ NOPI-458
Grid Location 0/60.5/44
- caliche as above, located ~ 10 cm below NOPI-457 along a sub-parallel

ECP 5/24/95

fracture. This caliche is very fine grained calcite, similar to samples collected from dip slope of cuesta below major fault zone. Thickness of this caliche is ~ 2 mm maximum. Appears to consist of multiple very thin layers of slightly varying tan to beige color suggesting many episodes of ~~pp~~ ECP 5/24/95

~~pre~~ ECP 5/24/95 precipitation !!

ECP 5/24/95

ECP 5/24/95

I. Reyes and E. Peacy set up an approximate (± 1 m) outline of the position of the adits projected up to level 410. Using that guide, I have chosen 4 areas for preliminary characterization for possible infiltration experiments.

Area 1 at: -1.5/12.0/10 is the S.W. end of the cross portion of the adit. At this position is the W. extension of the sub-vertical, Fe-oxide filled major EW fracture set. The Nopal tuff at this location is only moderately altered to kaolinite. In the area S. of the major EW fracture, across continuous outcrop there were: 19 fractures/meter (counted all easily visible to eye).

ECP 5/24/95

→ Sample NOPI - 495
Location - 1.5/12.5/10
collected for
matrix hydraulic
characterization,
- Nopal tuff, dark gray,
feldspar phenocrysts
partially altered
to kaolinite.

→ AREA 2 AT 11.5/13.5/10
is at the nominal
edge of the deposit.
Minor uranophane
is visible. Nopal
tuff at this location
is more strongly
kaolinized than at
Area 1. There is also
more Fe-oxide in the
tuff. This is another
intersection of the
sub-vertical, major
EW fracture set with
the adit. A
linear fracture density
of 25 fractures/m
was counted
immediately S. of the
major EW fracture.

ECP 5/24/95

Sample NOPI - 496
Location: 11/14/10
- Kaolinized Nopal tuff
with Fe-oxides,
possible minor U mineralization

→ AREA 3 AT 20.0/31.0/10

at the far N.E. end
of the cross portion
of the adit.
A 1 m count of
fractures showed
18 fractures/m.
Nopal tuff in this Area
is pink to beige in
color and moderately
kaolinized. Very little
Fe-oxide, and what
Fe-oxide is present appears
yellow-orange: limonite.
This describes
Sample NOPI - 497
Location: 20.0/30.3/10

ECP 5/24/95

AREA 4 at 35.0/6.0/10

low angle fracture sets with well-developed slickensides, minor chalcedony and occasional coarsely crystalline calcite.

→ SAMPLE NOPI-498 at location 35.0/6.5/10.0

dark gray Nopal tuff, only partial kaolinization of feldspar phenocrysts, very little iron oxides, linear fracture density of 25 fractures/m

KMJones 7/26/95
Sample NOPI-498
Location should read
6.5/35.0/10.0
per Eng. Pearey.

This project was ended by Newt Gingrich and company. No further work directly related to this notebook is anticipated at this time. The project terminated abruptly.

English Pearey
8/29/96