APPENDIX D

INTER-OFFICE MEMOS ON RESERVE ESTIMATES AND MINE PLANS (2000, 1999, AND 1996)

The floor of seam #4

The dolomite and shale impurities are very harmful in board making process. An early analytical report of thin section indicated that the floor dolomite (to some extent the uppermost silstone layer) is rich in iron (see attachment 1). Another report referred to paper-to-core bond problem. The X-ray analysis showed presence of small quantity of iron whenever there were bond problem (see attachment 2). In addition, when the chloride level at the face is already at 16 oz/ton level, these two impurities can itself carry chloride at 100 oz/ton. The shale is possibly the major culprit causing the board core to be soft and causing the moisture absorption problem.

There is a way to physically separate the ore body from floor. Ideally, usage of an undercutting machine before blasting will be the most suitable tool. A similar undercutter to this one is used in the Blue Rapids underground mine.

At the present time the mean to separate the gypsum from the floor is blasting. Since the floor dolomite is only 03 to 0.5 foot thick, the blast shatters it and some underlaying shale. The skill and experience of the scooptram's operator is vital to leaving the floor in place.

The interbed in the Bi-level Area

The floor impurities of seam #4 build the upper part of the interbed shale which is 1.5 to 3.0 feet thick. All the above said conclusions are relevant to this layer.
After several trials an acceptable blasting pattern was established to remove the shale. However from time to time it is necessary to re-blast the shale to get cleaner cut.
Usage of an undercutting machine to make pre-cuts in gypsum itself would be very beneficial. The shale is removed by a modified backhoe.

The floor of seam #5

There is the same problem with the floor as it is at the seam #4. Only dolomite was replaced with a 0.3 foot thick of sandstone. The sandstone can cause a grinding problems in the mill because it is a hard rock.
At present moment the mine plans to eliminate this problem by gradually leaving about a 1 foot of gypsum in the floor in all headingsi of the Bi-Level Area. Lack of experience to control the floor level prevented to do that earlier.

The anhydrite zone's

The anhydrite zone in the eastern part of the mine is associated with extremely high chloride concentration. The mine plans to pass underneath (e.g. Bi-Level Area) or selectively cut through this zone (e.g. 50E47N face).

Proposal

There are about 400 tons of rock from Bi-level and 600 + tons from #4 bed in temporary stockpiles nearby the feeder-breaker.

- send this rock to the mill with blend ratio 9 to 1 (bed #5/bed #4)
- move the feeder-breaker to 61E40N location that daily rock production can be done by one scooptram operator; all material is already on site.
- narrow the mine front in the Bi-Level Area to 450 feet (from 60E to 69E drift)
- gradually leave a 1 foot of gypsum in all headings in the Bi-Level
- break through each second crosscut to speed up the eastward advances.
- push the A drift until it pass the anhydrite zone; sent the rock to the surface stockpile

The size of the mine manpower will depend on the rock production' target set for the mine .

Option I

two production days/week	39,520 tons/year
surface stockpile	15,600 tons/year

39,520 tons equals 760 tons/week. This amount does not take recycled and synthetic gypsum into account therefore it keeps a safe margin for rock demands.

To speed up breaking through the anhydrite zone in ore body, rock from designated headings with higher chloride content (e.g. 50E47N) will be shipped to the rock stockpile on surface and left for the leaching process. To achieve the target of 15,600 tons/year the mine will ship 150 tons twice a week to fill in the mine rock bin. This amount of rock is enough to fill in the mine rock bin's capacity. Subsequently the truck driver can move this rock to stockpile between his trips to haul the Michigan Gypsum without any time delay.

1.) - Single shift, 5 days per week schedule: four days 10 hrs and 1 day 8 hrs
- 2 days full production day; .5 day for maintenance on rock handling system.

2.) Manpower:
4 production workers
2 mechanics

This option will keep the mine open and all mine equipments will be maintain.
If the market demands will increase the mine can increase its production.
The mine would work in a capacity of a back-up rock supplier if problems were occurred with the Michigan Gypsum rock or with its logistics.

Option II

Partial rock supply to both Board Plants.

East Plant	39,520 tons/year
West Plant	40,000 tons/year
Surface stockpile	up to 10,000 tons/year
Total annual Tonnage	89,520 tons

89,520 tons per year equals to 1722 tons per week. The rock production costs will be kept at $10/ton including rock haulage to the plants.

1.) - Single shift, 5 days per week schedule: four days 10 hrs and 1 day 8 hrs
- 1 day for maintenance on rock handling system.

2.) Manpower:
6 production workers
1 leadman/mine technician
2 mechanics

3.) pursue the possibilities to utilize an undercutter machine in mining our rock.

Rock quality targets.

For both options the rock quality should be as follow:

purity range	81 to 88% with average 84+%.
chlorides content range	16 to 24 oz/ton with average below 20 oz/ton.
chloride range for rock to the West Plant	12 to 20 oz/ton with average 16 oz/ton.

Subsequently, as the mine advances to the East, all produced rock should meet the requirement 16 oz/ton or less for the chloride content.

Rock from faces that show more then 25 oz/ton in combine rock tests should be divert to the surface stockpile.

The Michigan Gypsum rock

At the present time, it is favorable option to use this rock. However there may be more than a few set-backs. As it was mentioned above, the control over rock supply and all of its logistics will be limited. Bad weather (cold or to wet) may hinder the rook feed to the mill as the West Plant experienced last year on a couple occasions.

The fine material has about 80% purity and the solid rock about 83% to 88% with the chlorides in the single digits. However; geologically this ore is coming from a gypsum deposit which is part of Michigan Formation. Our ore deposit belongs to this same period. Thus we may expect some unfavorable swings of chloride content in the Michigan Gypsum rock as it was true in our rock (see attachment 3).

On the other hand, since both deposits are related they can gradually supplement

each other after our mine upgrades its own ore. Both rock can be blend together in a controllable manner that the chloride content will be below 10 oz/ton.

This proposal was compiled based on data and facts available at the time being and it tries to be as objective as possible. The mine has a lot of potential with its rock reserves. However, to utilize the potential everybody involved in this project has to make an extra effort to do it.

Mine Leader

Slavek Ochocinski

GEORGIA-PACIFIC
GRAND RAPIDS

INTER-OFFICE MEMO

To: Jim Price
Michael Pezzuto

Date: January 05, 2000

From: Slavek Ochocinski

cc: Jerry Lunn

Subject: Mine proposal to upgrade the rock quality from Grand Rapids Mine .

The basic question is what we can do with about 3, 930,500 tons of documented gypsum reserves lying a 0.5 mile from the Board Plant. For years we have been making a saleable product from our rock . Since the product(s) line was changed we experienced quality problems which are related to the chloride content level and lower purity of the mined rock. The easy answer is to close the mine and to get rock from outside and be at the mercy of the rock supplier, haulage contractor and the weather conditions.

There is another solution which bears some risk but its free from above said concerns. Everybody agrees that customers have to be satisfied with our product(s). We have to use only valuable components to make a good board.

Believe it or not, our gypsum is a one of them. I would like to present a few data to prove it. However the imperative shall be to learn and execute better the process of "sorting the wheat from the chaff"..Based on rock samples from the headings and the diamond drill cores, gypsum has 95 % purity in the seam #4 and around 90% in seam #5. It means that the gypsum itself is well developed ore deposit. The purity of our rock is higher than the pure Michigan Gypsum rock. With the exception of ore of the anhydrite zone, historical and recent data indicate that chloride content in the gypsum is in the single digits or less then 16 oz/ton. This is our "wheat".

Now it is coming the "chaff" story. The bed #4 has two distinctive thin layers (0.3 to 0,1 inch thick) built of silstone or dolomite which are divided the seam into three sections. They have higher chloride content. Since they are thin layers, historically they had increased the chloride level of a couple of ounces/ton but they can lower the purity to 86% at faces with lower heights. The major sources harming the rock quality are:

- dolomite and shale in the floor of seam #4,
- this same dolomite and shale being an interbedded layer in the Bi-level Area,
- sandstone and shale in the floor of seam #5
- anhydrite in the anhydrite zone.

What is important about the anhydrite presence is that any sign of it is associated with high concentration of chloride in adjacent areas. Even pure crystals of salt could be found there.

Quality of the mined ore.

Until 1988 the rock purity was at 82% and the chloride content ran from 8 to 15 oz/ton. Then while the mine front progressed eastward the chloride numbers went into the low twenties oz/ton. When the headings started to pick up traces of anhydride, the mine front was widened in the East and turned to the South. Thanks to good rock quality policy including rock sampling on each face and at least every 50 feet apart, the mine had maintained the chloride content at 22oz/ton for several years. Rock blending was essential.

In addition to mining bed #4, about 25% of production was coming from benching seam #5 - after shale in the floor was stripped by a bulldozer. The rock from bed #4 had have 80% purity and chloride content less then 17oz/ton.

From time to time there were lapses in the rock purity, due to lower mining heights (9 to 9.5 feet thickness of gypsum deposit) and taking too much shale from uneven" rolling" floors. Shale in general is relatively soft rock.

The floor shale, besides hampering the purity, was an additional source of higher chloride content.

The mine has always been under the obligation to tailor its production to deliver the best quality rock with the lowest chloride content. After awhile the mine's eastward advances ended up with 1,000 feet wide front with anhydrite in the faces. A major portion of the mine reserves was cut off due to anhydrite in the top two sections of the #4 bed. The mine front with all of its logistics was turned into the North and NorthWest direction.

The rock quality target was set at 82% +/- 5% for purity and 22oz/ton +/- 5 oz/ton for chloride concentration.

Mining Method: - Bi-Level Mining.

In the middle 90-ties the mine has started to develop a Bi-level method to see if there are possibilities to break though the anhydride zone to the East.

The Bi-level method explores the bed #5 and the bottom section of bed #4. It is crucial to remove the interbedded shale as cleanly as possible before attempting to blast the gypsum layers at the face. After numerous trials the mine established a drilling pattern to blast the shale successfully .

A new face drill for drilling high profile headings was purchased. A backhoe, with modified boom to scrape the blasted shale, was also acquired.

The Bi-level method allows mining underneath the anhydrite zone to reach the other side of the said zone and return the mining of bed #4 to full height.

There is additional future benefit of the Bi-Level method. It creates a possibility to mine the two beds concurrently as one face. Each blast will yield about 225 tons with purity around 90% and chloride content less than 16 oz/ton.

At the present time there are favorable signs that we are not too far from reaching the other side of the anhydrite zone. The 50E drift in bed #4 has only traces of anhydrite in the middle section. In the Bi-level, the face in 65E drift already includes the bottom and the middle section of the #4 bed.

A couple of short trial tests from single faces (66E46N, 65E46, 64E45), including 100 tons of rock per test, showed purity from 84% to 88%. Our lab results showed the chloride content in the middle twenties oz/ton.

G-P Decatur Lab ran check- tests for a landplaster made from our rock on 11/18, 11/19 and 11/20/99. The mine rock blend consisted of 80% from Bi-level area and 20% from #4 bed. The results were respectively: 82.08% and 18.88oz/ton, 75.58% and 24.64oz/ton, and 82.08% and19.78oz/ton.

Since October 1999 we gradually started to leave about a foot of gypsum in the floor. At the present time the following headings have gypsum floors deeper than 20 feet: 66E47N, 65E47N and 64E45N.
The following headings have first round gypsum floors: 63E44S, 44S63, 61E41S and 41S61E.

Keeping about 1 foot of gypsum in the floor and taking extra care in blasting and removing the interbedded shale should improve the rock quality as follows:

- purity range 82% to 87%; average 85%
- chloride content range 161 to 25 oz/ton; average 20 oz/ton

The chloride content level will steady decrease along the mine advances to the East. Eventually the rock quality will be as follows:

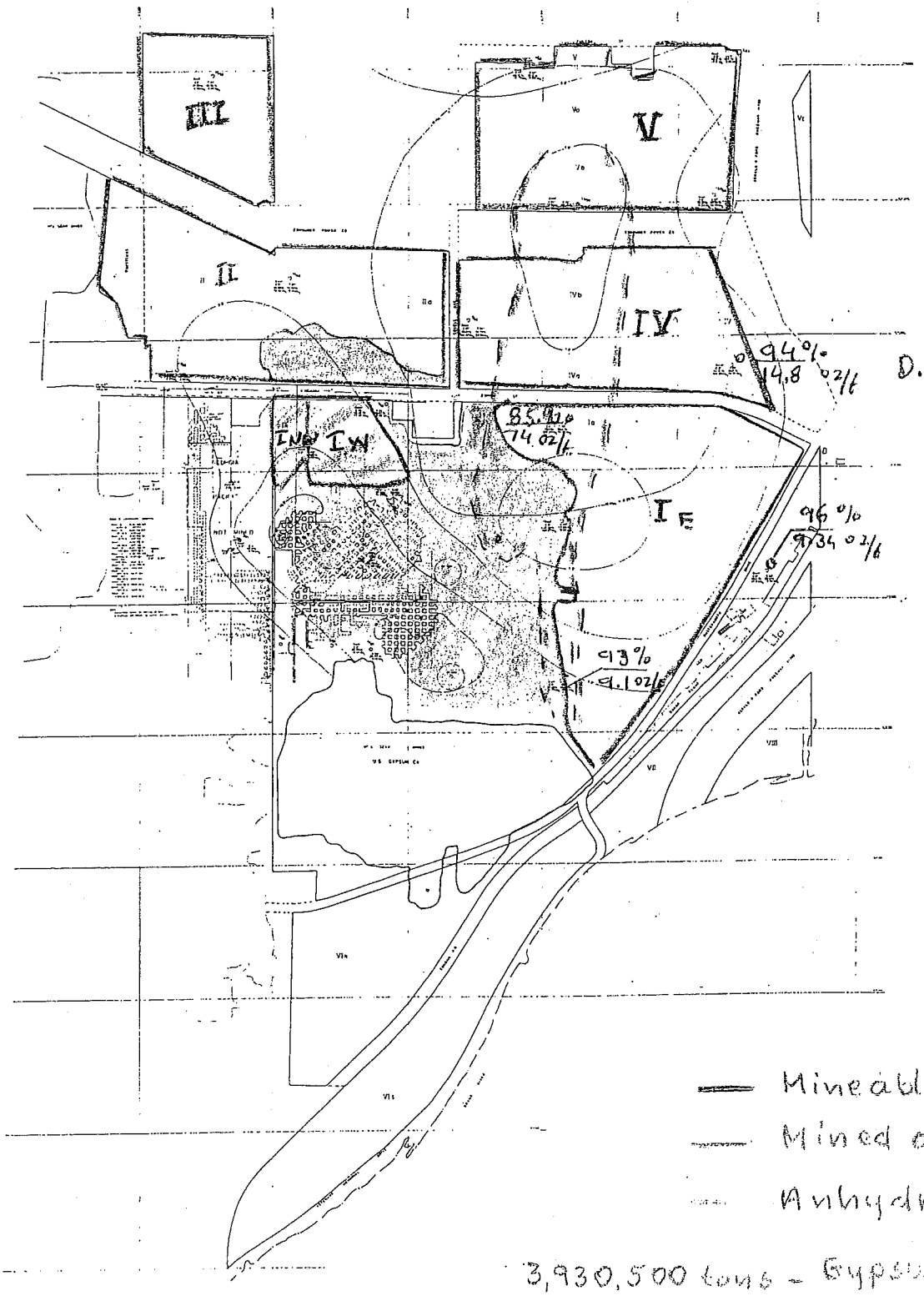
- purity range 82 to 88%; average 85%
- chloride content range 8 to 16 oz/ton; average 12 oz/ton.

A detailed proposal of a mining plan to achieve the above targets will be forthcoming.

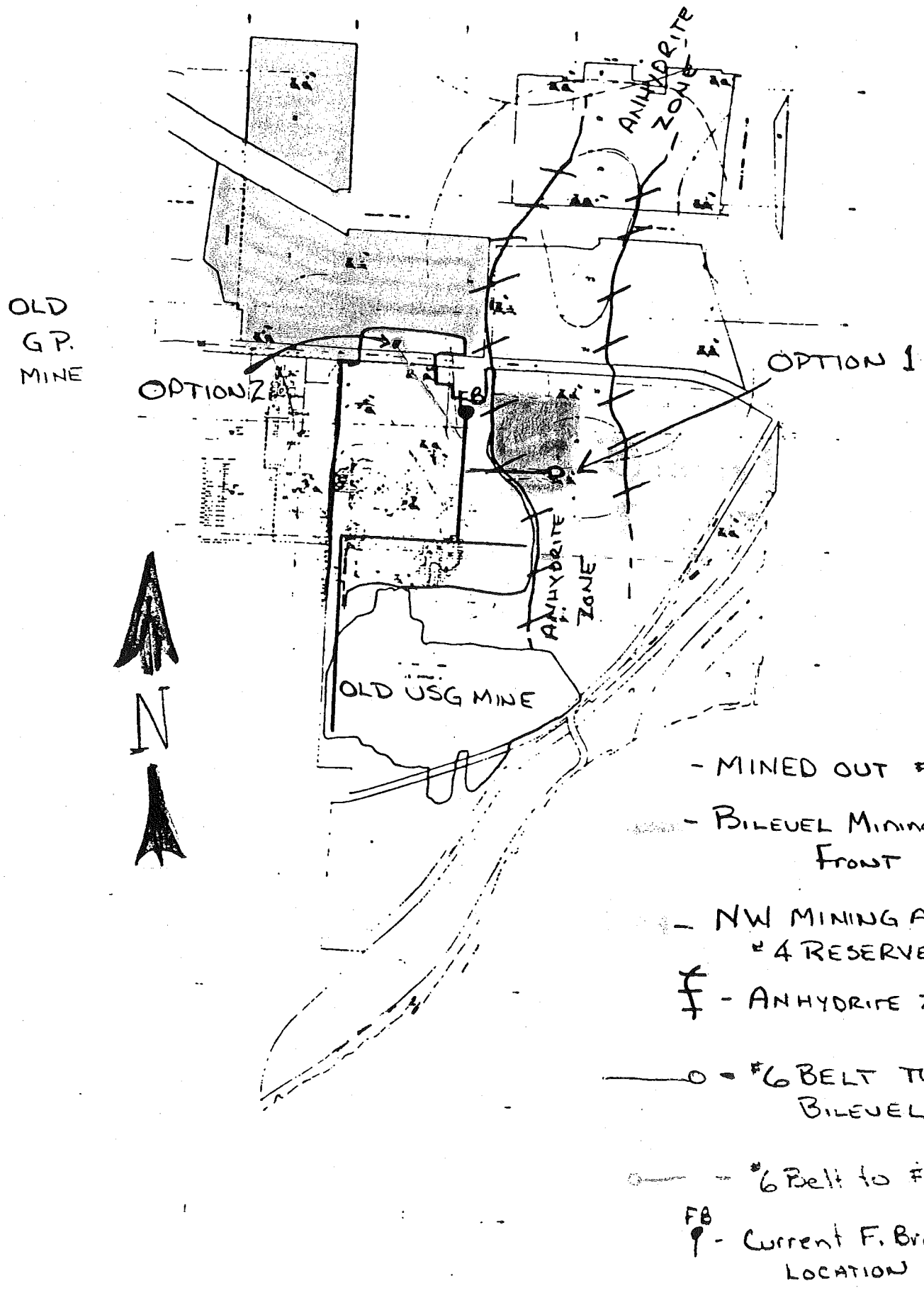
Mine Leader

Slavek Ochocinski

Grand Rapids Mine
Gypsum Reserves – 1999 YTD



3,930,500 tons – Gypsum Reserves 1999 YTD


OLD
G.P.
MINE
OPTION 2
OPTION 1
FB
ANHYDRITE
ZONE
ANHYDRITE
ZONE
OLD USG MINE
N
- MINED OUT #4
- BILEUEL MINING
FRONT
- NW MINING ARE
#4 RESERVES
- ANHYDRITE ZON
- #6 BELT TO
BILEUEL
- #6 Belt to #4
FB
- Current F. Break
LOCATION

GEORGIA PACIFIC GYPSUM
GRAND RAPIDS
INTER-OFFICE MEMO

To: Felmer Cummins

Date: August 14, 1996
cc: Sylvan Lutey
Curt Riggen

From: Charlie Johnson

Subject: #6 Mine Conveyor @ the Grand Rapids Mine

In the past there was concern with the gypsum reserves at Grand Rapids when the large anhydrite zone was encountered to the east. The anhydrite zone cut off all mining to the east and forced all mining to the north west. While we are certain there is another side to the anhydrite zone to the east, we do not know where. A new mining procedure was successfully developed to mine the #5 bed and the bottom of #4 bed to enable mining underneath the anhydrite zone. Utilizing this mining method, reserves were calculated to be 4.6 million tons (30.5 years at 150,000 tons/year). With proven reserves and with slightly improved rock quality, this is the direction Domtar Gypsum decided to go in 1995.

#6 conveyor was to be installed running west to east enabling the feeder breaker to be located on the new mining front. All material is purchased and on site. The installation is 90% completed. With the purchase of Domtar Gypsum by Georgia Pacific Gypsum, work on the conveyor was halted, while a decision whether the mine would remain open was pending.

As there have been indications that the mine will continue to operate, a conveyor belt installation must be completed to maintain haulage efficiency and reduce maintenance costs. There are two options:

OPTION #1: Complete the installation to the East with 100% mining at the lower mining horizon.

* Completion cost would be minimal. Set the tail pulley, install belting, complete electrical wiring and move the feeder breaker ($4000 to $6000.)
* Guaranteed long term reserves.
* Consistent rock quality - Purity - 79 to 83%
  Chlorides - 18 to 28 oz/ton
* Removal of the shale interbed is very labor intensive and requires additional drilling and blasting, rock cost per ton is $0.50 per ton more than only mining #4 bed. ($9.50 direct cost per ton)
* There are two long term benefits to this option:
  1) Progressing to the east will eventually reach the other side of the anhydrite zone. At that point, both #4 and #5 bed can be mined concurrently. The larger heading will improve efficiency and rock quality. Reaching up to mine the top of #4 bed

increases mine reserves by 1.9 million tons or a total mine life of 43 years.

2) As originally planned mining to the east will bring the mine workings next to the mill rock silos. Excavating a shaft and installing a vertical conveyor would eliminate the need for trucking the rock to the plant.

OPTION #2: Extend #6 conveyor to the north west and mine #4 bed only.

* Current installation would have to be removed and relocated. Sufficient material is on site, but required labor for relocation and a longer conveyor would be much larger. Estimated cost would be $40,000.)

* In the #4 bed of the Grand Rapids Mine, there are no guarantees. Current best knowledge indicates the area minable to the north west contains 1.7 million tons of gypsum. However our history is that anhydrite can be encountered unexpectedly. In early July, a spot of anhydrite was hit at 84E 15. Not a confidence builder.

* Less consistent and lower rock quality.

Purity - 78 to 82%

Chlorides - 15 to ????. (We would work to maintain lower chlorides ranges, but we could be severely limited with what we have to blend with. Unlike the Kentwood mine, Grand Rapids has a soft floor and the floor rolls. Both of these factors negatively impact rock quality. Current mining has encountered severe rolling in the north west area and reports from the closed Georgia Pacific mine is the farther to the west you go the more like a roller coaster the floor gets.

* Although roof bolting will be required, mining #4 bed only will result in a lower cost per ton. ($9.00 direct cost per ton)

My recommendation is to follow option 1 and complete the #6 conveyor into the bilevel area. Waste removal will continue to be slightly more costly, but the benefit of more consistent rock quality to the plant will save in additives and board quality. However, the most important consideration is the variation of rock quality when mining #4 bed only and the uncertainty of encountering anhydrite at any time in the upper portions of #4. There is a projected future in bilevel mining. The only definite in mining #4 bed only is dirty and salty (not a good combination for us!)

Attachment 1

Thin Sections Summary Report

Grand Rapids, Michigan

Seven samples were submitted from the three interbeds that divide the gypsum units of the #4 Bed at Grand Rapids. Michigan. Another sample was submitted from the middle gypsum layer (#4 Bed). The uppermost interbed consists primarily of dolomitic litharenite (dolomitic sandstone). The middle interbed is an arenitic iron dolomicrite (sandy dolomite). The lowermost interbed is a dolomicrite (iron -rich dolomite). The sample taken from the middle gypsum unit of the #4 Bed consists of gypsum with about 2% finely-disseminated opaques (mostly pyrite, with limonite and hematite).

Mineral Assemblage

Three samples from the uppermost interbed contain:

	101B	103B	104B
1. Quartz	50%	40%	60%
2. Dolomite	39%	-	13%
3. Iron Dolomite	-	51%	2%
4. Gypsum	2%	4%	22%
5. Calcite	9%	-	3%
6. Accessories (Opaque-Pyrite)	-	5%	-

Two samples from the middle interbed contain:

	63D	107D
1. Quartz	35%	20%
2. Dolomite	13%	10%
3. Iron dolomite	32%	65%
4. Gypsum	20%	-
5. Accessories	<1%	5%

Two samples from the lowermost interbed contain:

	33F	101F
1. Quartz	3%	5%
2. Dolomite	63%	23%
3. Iron dolomite	30%	70%
4. Gypsum	2%	-
5. Accessories	2%	2%

The sample 98C (#4 Gypsum Bed) is 98% gypsum with 2% opaques (Pyrite).

The results indicate a progressive downward trend of the interbeds from arenitic (sandy) material through sandy dolomite to dolomite rock. The quartz grains are subangular to subrounded suggesting a sabkha environment of deposition. This would explain the high salt values obtained in the mine and its association with anhydrite.

Note: The process by which these thin sections are prepared causes halite (salt) to dissolve out. Therefore these results do not include the relative percentage of salt. However cubic "holes" were observed in several sections indicating the presence of halite.

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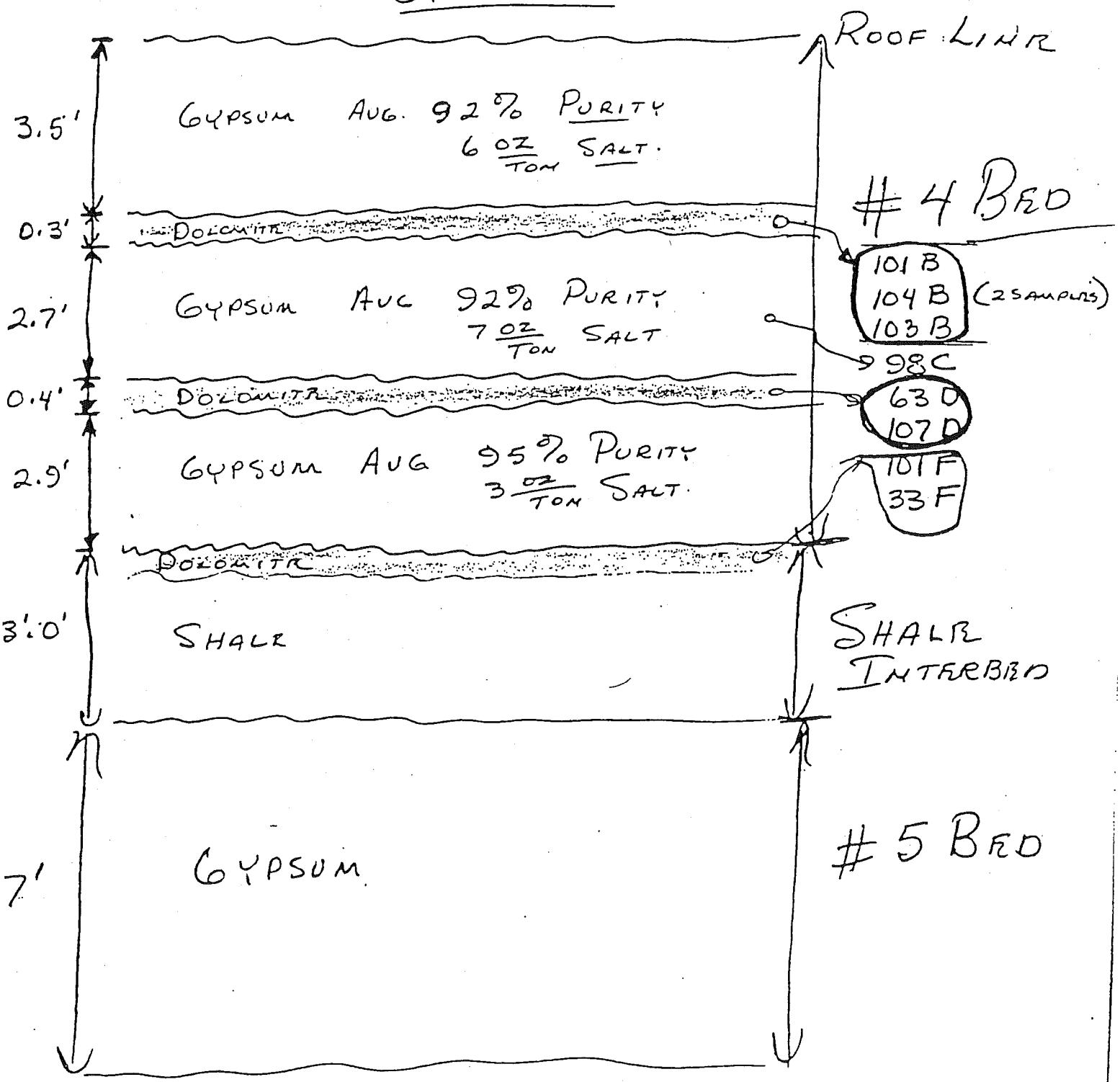
M.../ 18 1082

Samples From Grand Rapids, Michigan.

Section



Attachment 2

Domtar Inc. / Centre de recherches
Domtar Inc. / Research Centre

DOMTAR

COURRIER INTERNE

To/À R. Bruce

Date 23 Sept. 85

Ref./Réf.

CC/Copies R.J. Booth
D.A. Moses, Grand Rapids

From/De F. Vrillaud

Subject/Sujet

GRAND RAPIDS GYPSUM BOARD PAPER-TO-CORE BOND
Project 85-7001-03

Four gypsum board samples, i.e. three with a bond problem and a fourth with an excellent paper-to-core bond, were examined by Scanning Electron Microscopy to try to shed more light on the "on and off" bond problem at the Grand Rapids plant. Examination of the boards with poor bond showed that the areas where the paper liner was no longer attached to the core were entirely covered with broken or poorly shaped crystals (see photographs). The good board on the other hand had gypsum crystals well developed which appeared to weave around the paper fibres at the paper-to-core interface. On the surface of the boards with no paper-to-core bond, the paper fibres have left imprints but have not adhered to the core. The broken crystal phenomenon noted on the boards with no bond, is only a few thousands of an inch thick, below that crust well shaped crystals can be seen. The X-ray spectrum of the crust indicates the presence of a small quantity of iron. Similar examination at the paper-to-core interface of the good board does not show any iron present. The only other elements displayed by the X-ray energy dispersive spectrometer are: aluminum, silicon, calcium, sulfur and the S.E.M. coating elements gold and palladium. It becomes then tempting to speculate that one of the possible substances responsible for the bond problem might be some type of iron compound, since the other elements found or the interface either make up gypsum or are commonly found in it, and are not known to affect the properties of gypsum boards. As an extension to this preliminary investigation it would be interesting to study the effect of some iron based compounds on gypsum crystal formation and growth.

It was not possible to determine the chloride content at the paper-to-core interface of the investigated board samples, because the amount of material that could be scraped off was far too small to carry out a meaningful test. Chlorides level determinations were performed on full thickness samples, and the results recorded in Table I show that the NaCl content is as high in the board with a good bond, as it is in the board with a poor bond. In this instance, it does not appear that chlorides are responsible for the poor paper-to-core bonds.

F. Vrillaud

F. Vrillaud

WC

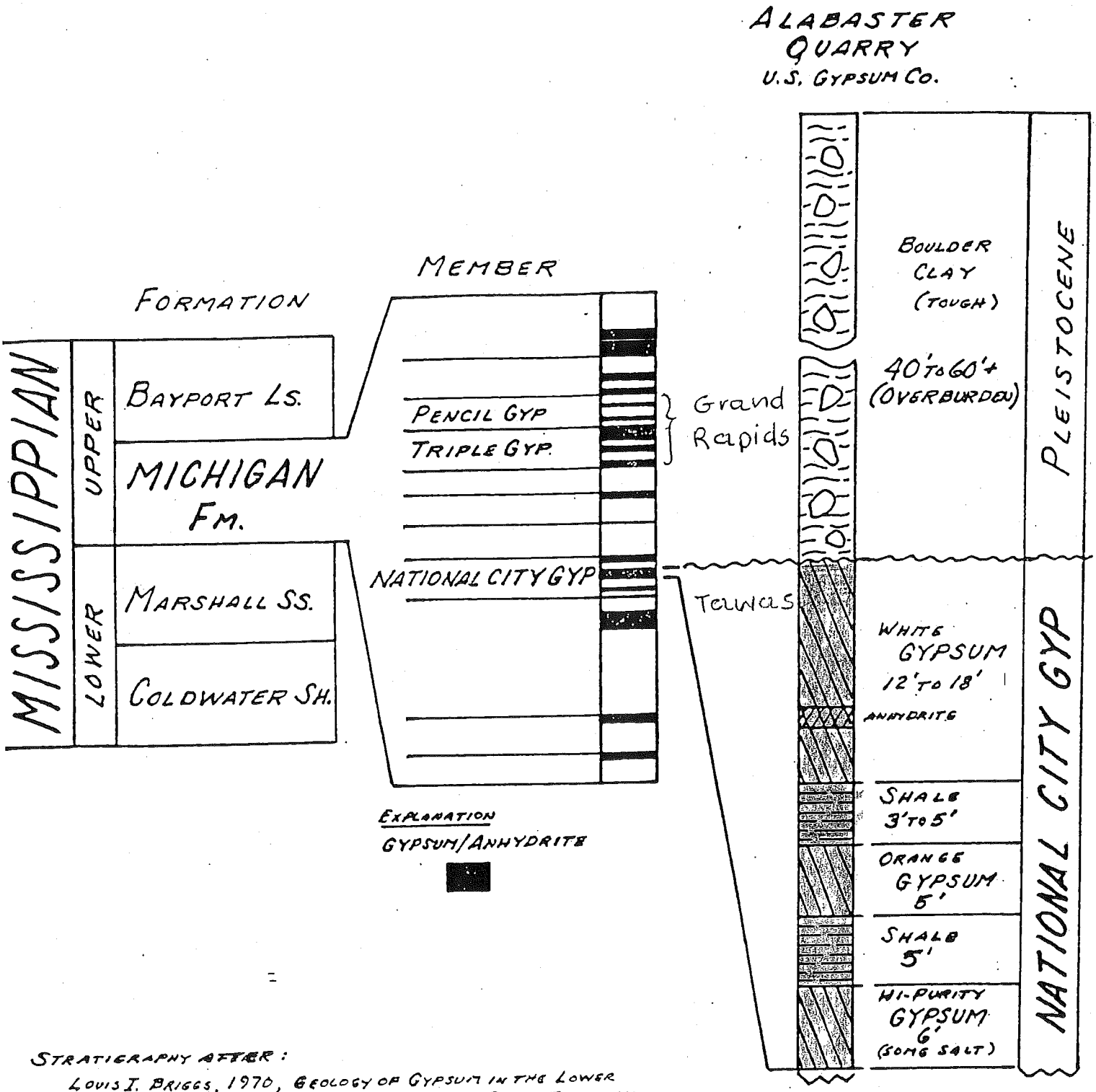
TABLE I

- GRAND RAPIDS BOARDS -

Chloride Levels

	Chlorides NaCl - oz/ton of Landplaster
Bad Board 85-08-15 21:00 (½" regular)	11.02
Bad Board 85-08-15 (⅝" F.G.)	9.28
Bad Board 85-08-15 (½" regular)	13.34
Good Board 85-08-24 8:30 (½" regular)	11.02

Attachment 3



STRATIGRAPHY AFTER:

LOUIS I. BRIGGS, 1970, GEOLOGY OF GYPSUM IN THE LOWER PENINSULA, MICHIGAN, PROCEEDINGS SIXTH FORUM ON GEOLOGY OF INDUSTRIAL MINERALS, MISC. 1, GEOLOGICAL SURVEY DIVISION, MICH. DEPT. NAT. RES.

A. H. STEVENS, 1968, ECONOMIC POTENTIAL ON MICHIGAN'S GYPSUM DEPOSITS, CONSUMERS POWER COMPANY, JACKSON, MICHIGAN.

STRATIGRAPHIC SECTION ~ GYPSUM QUARRY ALABASTER, S.E. IOSCO COUNTY MICHIGAN

GEORGIA-PACIFIC
GRAND RAPIDS

INTER-OFFICE MEMO

To: Jim Price
Michael Paused

Date: December 23,1999

From: Slavek Ochocinski

Subject: Grand Rapids Mine – Evaluation of Gypsum Ore Deposit.

The local gypsum ore deposit is part of Michigan Formation (Triple Gypsum - Member). The Grand Rapids Mine has about 3,930 500 tons of gypsum reserves if the Bi-level mining method will be the only one applied. At production level at 100 000 tons/year the mine life span will be 39 years. The rock production cost will be at $10 or less per ton including rock transport.

Quality of Gypsum Depcsit.

There are two gypsum seams separated by 1.5 to 3 ft of shale: seam #4 and #5. Seam #4 is 9 to 11 feet thick with extra 2 feet left in the mine roof. Hundreds of rock samples have indicated that gypsum itself is about 95% pure. However two distinctive layers of siltstone and dolomite, 1 to 5 inches in thickness, degrade the purity to 86%. In the East part of the mine, gypsum converts into anhydrite. One foot layer of anhydrite appears in the center section of bed #4 and - to a lesser extent - another foot of anhydrite shows in the bottom of the upper section of the said seam.

The anhydrite zone runs in the North-South direction. Its Western edge is well know but its Eastern boundary has to be defined. Some mining headings that are cutting through the zone indicate no anhydrite (65E47N) or only small anhydrite nodules in the center of #4 seam (50E47N). Four cores from diamond drill holes in the Eastern side of the mine do not show any anhydrite presence and they have low chloride content.

The #5 seam (5 to 9 feet thick) includes random and irregular strikes of dolomite impurities but does not have any trace of anhydrite. Its purity is in a low range of 90% but it may be as low as 85%.

The chloride content distribution in seam #4 reveals a complex pattern. Historically gypsum in the two lower sections has had chloride in single digits with the upper section no more than in the middle twenties oz/ton. The high chloride content was coming from the two thin layers of impurities and from shale in the floor.

The #5 seam has showed less then 10 oz/ton.

In the Western half of the mine, chloride content in rock has been in the single digits or less then 16oz/ton. With the mine front moving eastward, the chloride concentration has progressively increased in gypsum in the center section of seam #4 and in the two adjacent layers of impurities. Subsequent headings have started to unveil traces of anhydrite. When they had struck a solid foot of anhydrite, the whole mining front was stopped.

DOMTAR GYPSUM
GRAND RAPIDS
INTER-OFFICE MEMO

To: H. Fields

Date: April 19, 1995
cc: S. Lutey
R. Hartviksen

From: Charlie Johnson

Subject: Grand Rapids Mine Gypsum Reserves

Attached are the project gypsum reserve calculations and maps delineating areas where the reserves can be mined at Grand Rapids. There are three sets of calculations based on the mining method.

Tabulation 1: Bilevel mining or the new mining method where all of #5 is mined with the bottom (E - gypsum) of #4.
4,573,384 tons @ 150,000 t/yr. = 30.5 years

Tabulation 2: Bilevel and high profile mining, where all of #5 and all of #4 are mined when the quality of #4 allows.
6,568,867 tons @ 150,000 t/yr. = 43.8 years

Tabulation 3: Old mining method, only #4 is mined with some areas of #5 benched.
1,713,570 tons @ 150,000 t/yr. = 11.4 years

Charlie Johnson

3,930,500 tons - Gypsum Reserves
1999 YTD

Grand Rapids Gypsum Reserves
1995 Revision

Version I: Bi-level mining method

Tab. 1

Mining Fields	Bi-level mining #5 Seam			#4 Seam - "E" part			Combine Field Tonnage
	Width [ft]	Area [sq ft]	Tonnage [tone]	Width [ft]	Area [sq ft]	Tonnage [tone]	[tone]
I	6	3639040	919092.2	3	3639040	459546.1	
I West	6	394880	99732.66	#4	Seam	mined out	
I N-W	6	100480	25377.68	9.5	100480	40181.33	1543930
II	4-7	2526720	625309.2	3	2526720	319079.9	944389.1
*) III				9.5	983040	393111.6	393111.6
IV	4-8	2189440	573045.2	3	2189440	276487.4	849532.6
V	6-9	1838720	610222.7	3	1838720	232197.7	842420.4
Total		10689280	2852780		11277440	1720604	4573384

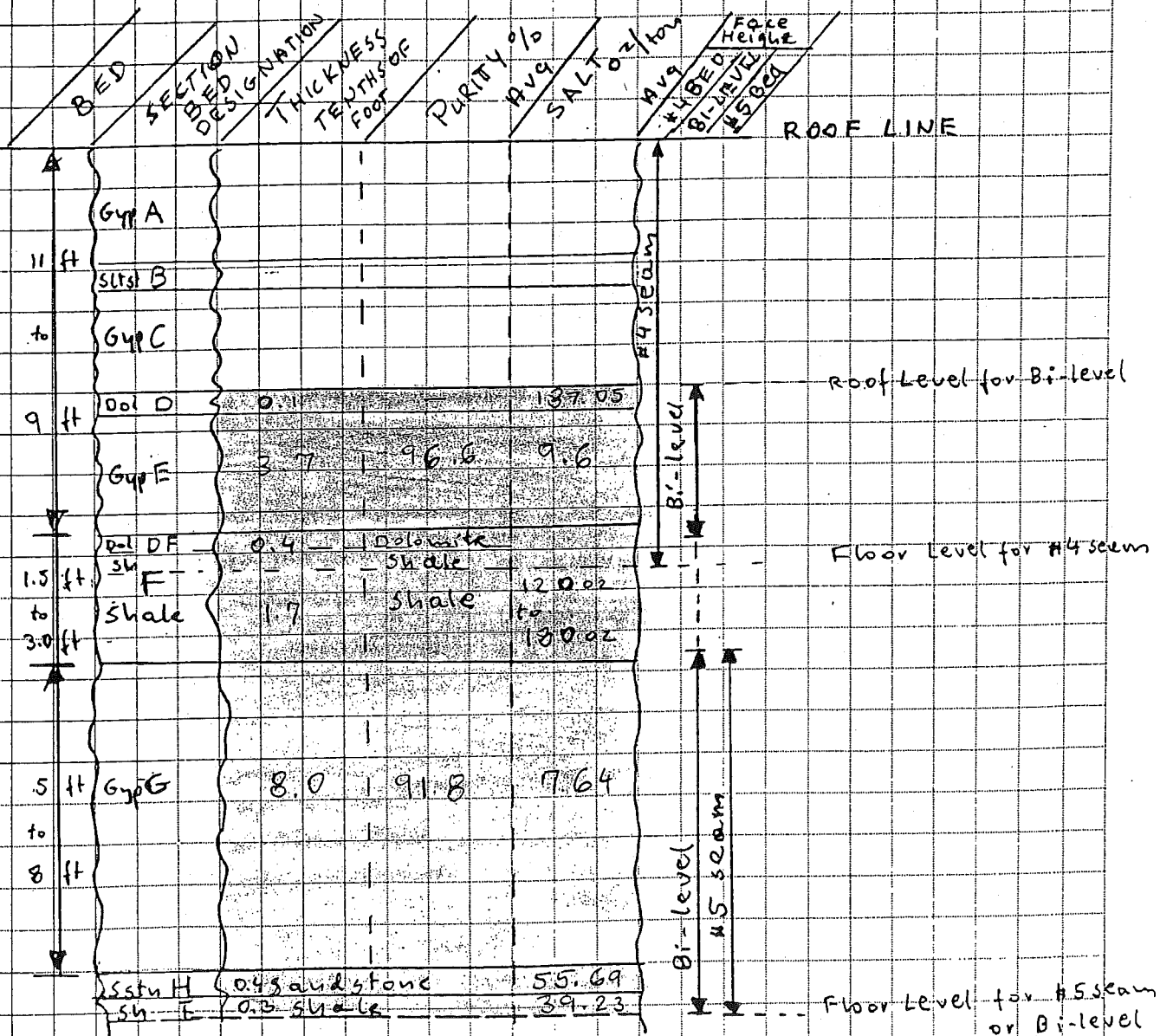
*) Drilling core data shows 5-6 ft of #5 seam.
Drilling stopped 5 ft below with no positive indication of #6 seam.

Calculating Factors:

tone conversion - 145 #/Cu.ft. = 2.3241tone/Cu.m.
Recovery - 64% -
NaCl Max - 0.05% (16oz/tone) not blended rock
- 0.14% (50oz/tone) for rock #4 seam if blended with #5

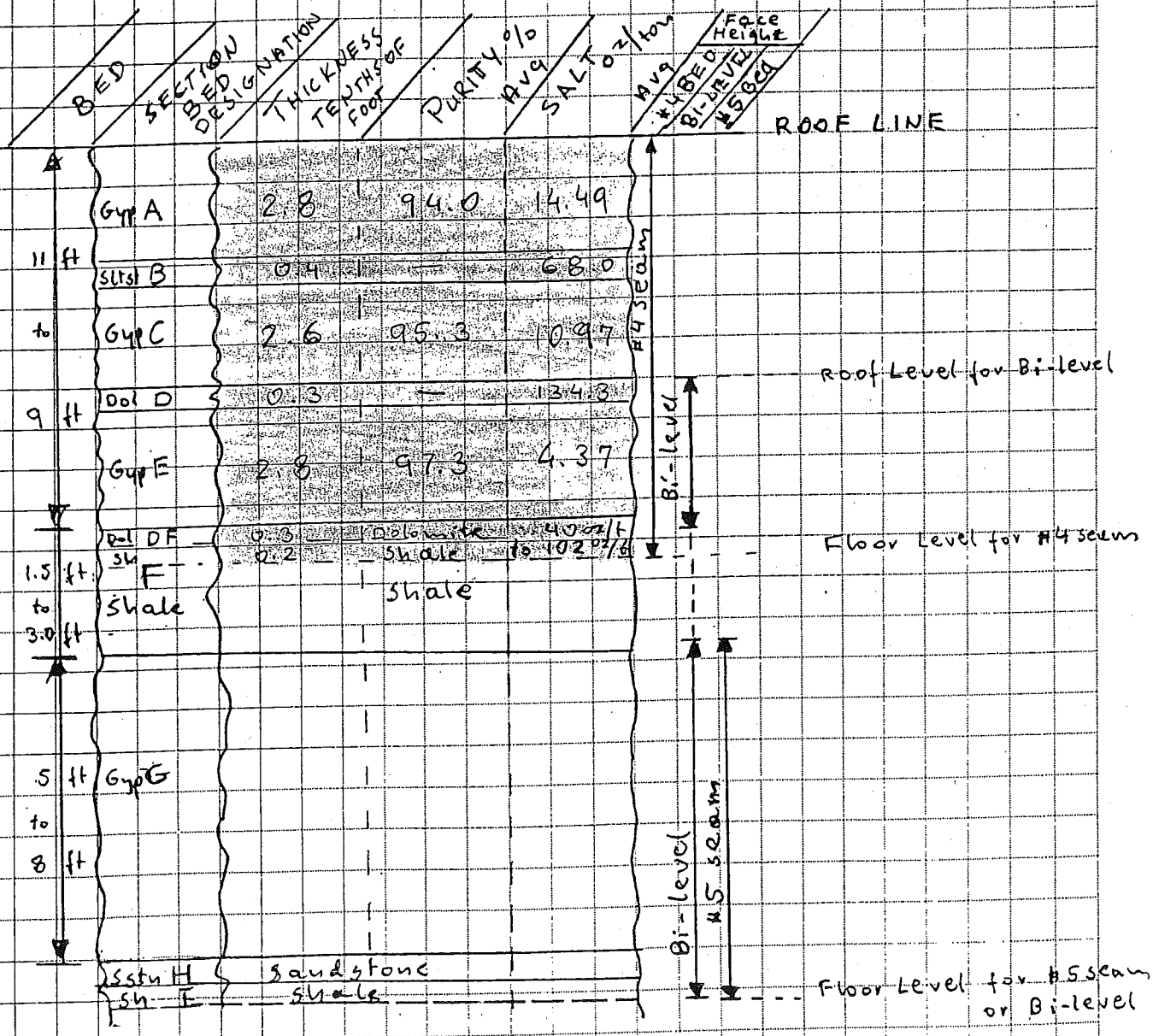
1999 Year

Section of Grand Rapids Part E of #4 seam + #5 seam Bi-Level Area



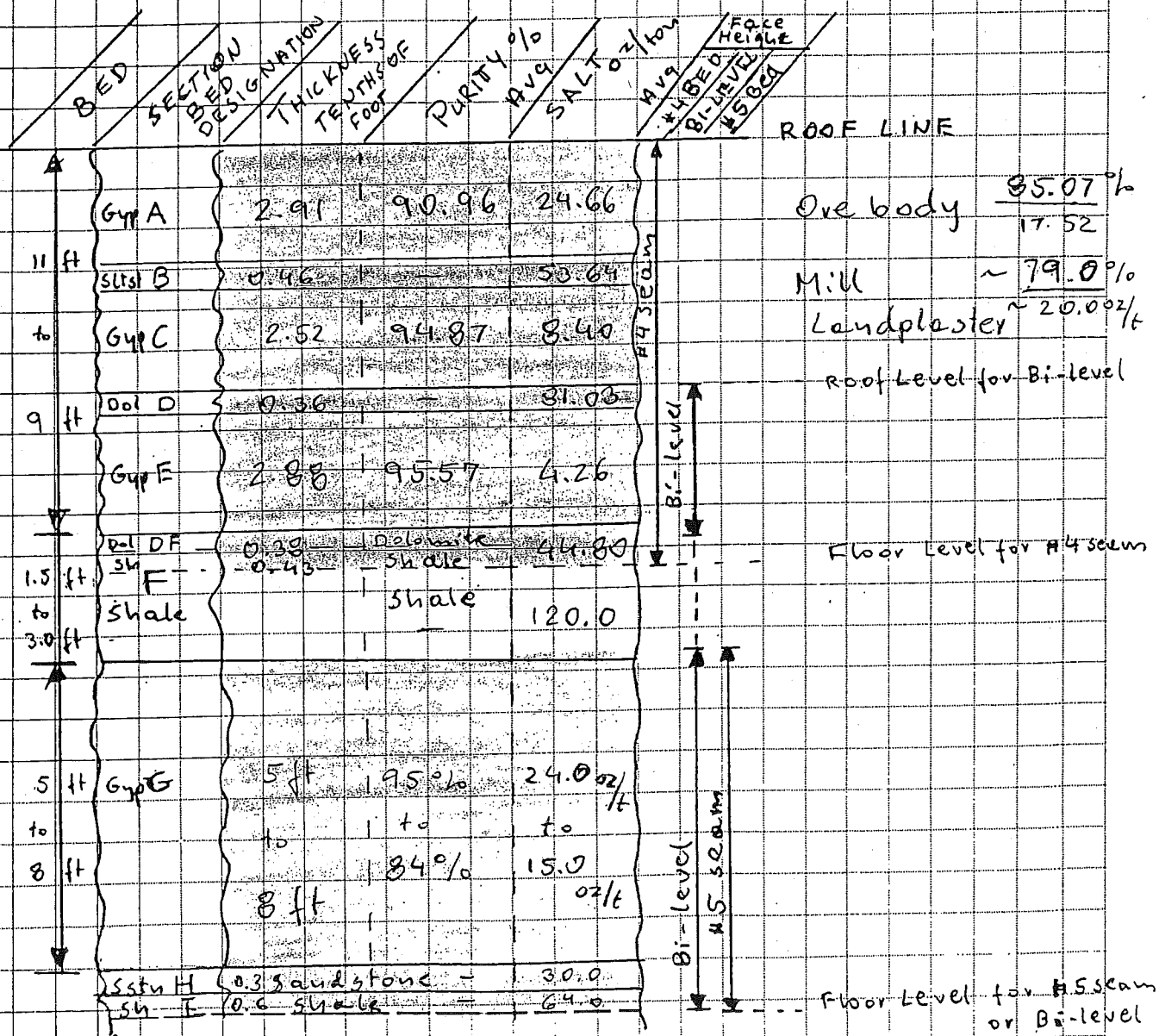
1999 Year

Section of Grand Rapids
#4 seam



Jan - March 1994

Section of Grand Rapids #4 seam + #5 seam



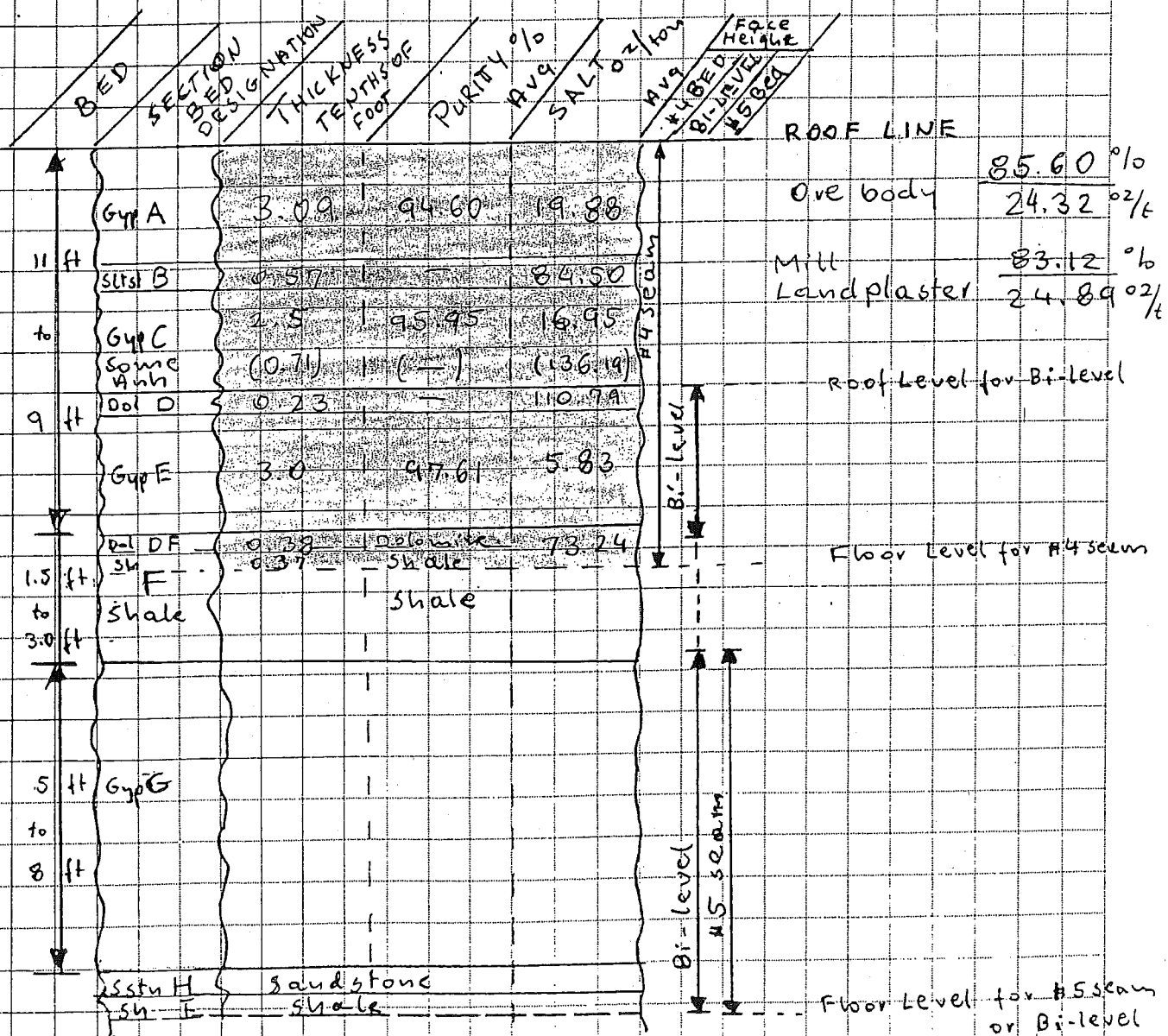
Ore body 85.07 % / 17.52

Mill ~ 79.0 % / ~ 20.00 oz/t

Landplaster

1990 year

Section of Grand Rapids
#4 seam

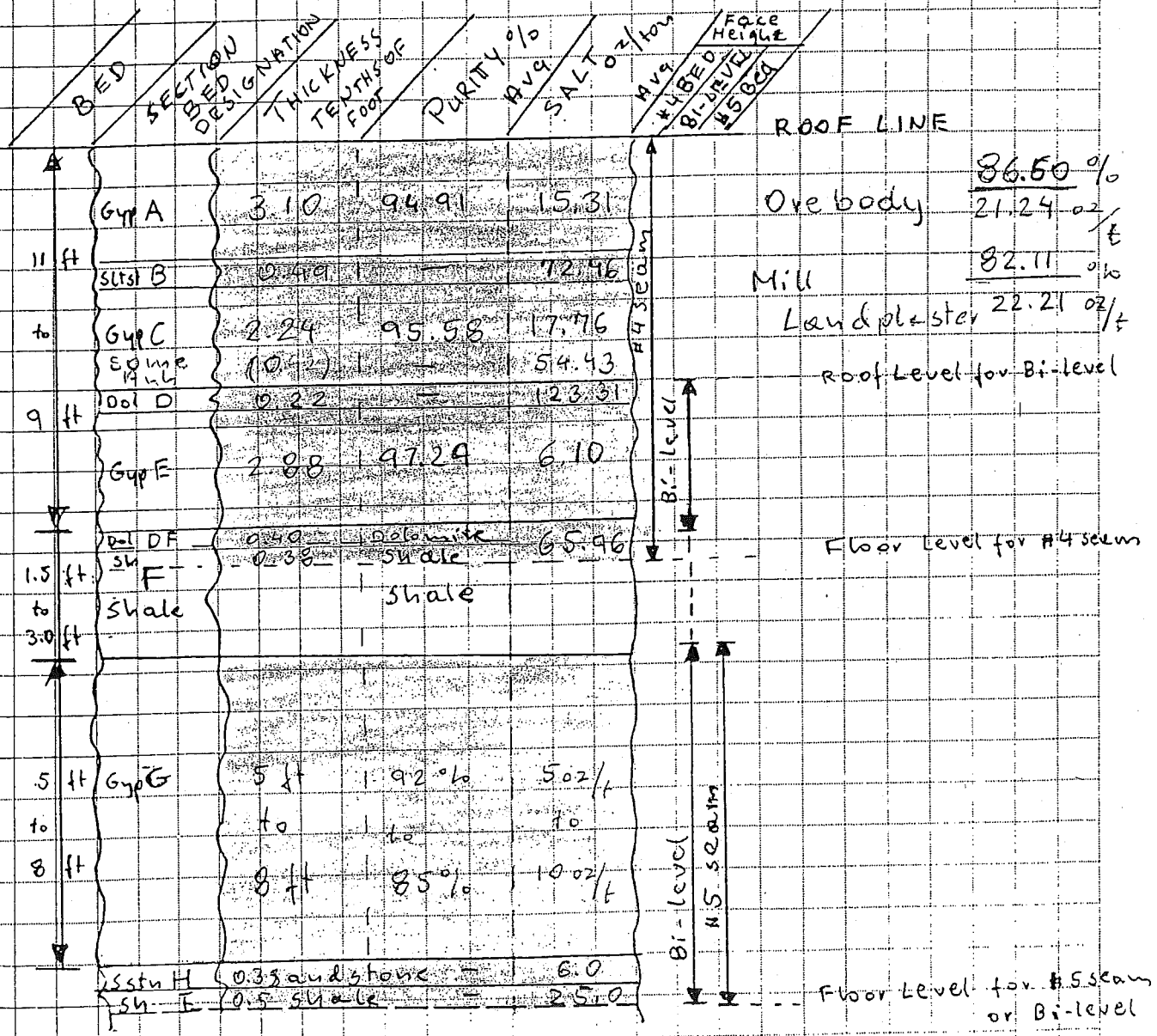


Ove body 85.60 %
24.32 oz/t

Mill Landplaster 83.12 %
24.89 oz/t

1989 year

Section of Grand Rapids
#4 seam + #5 seam

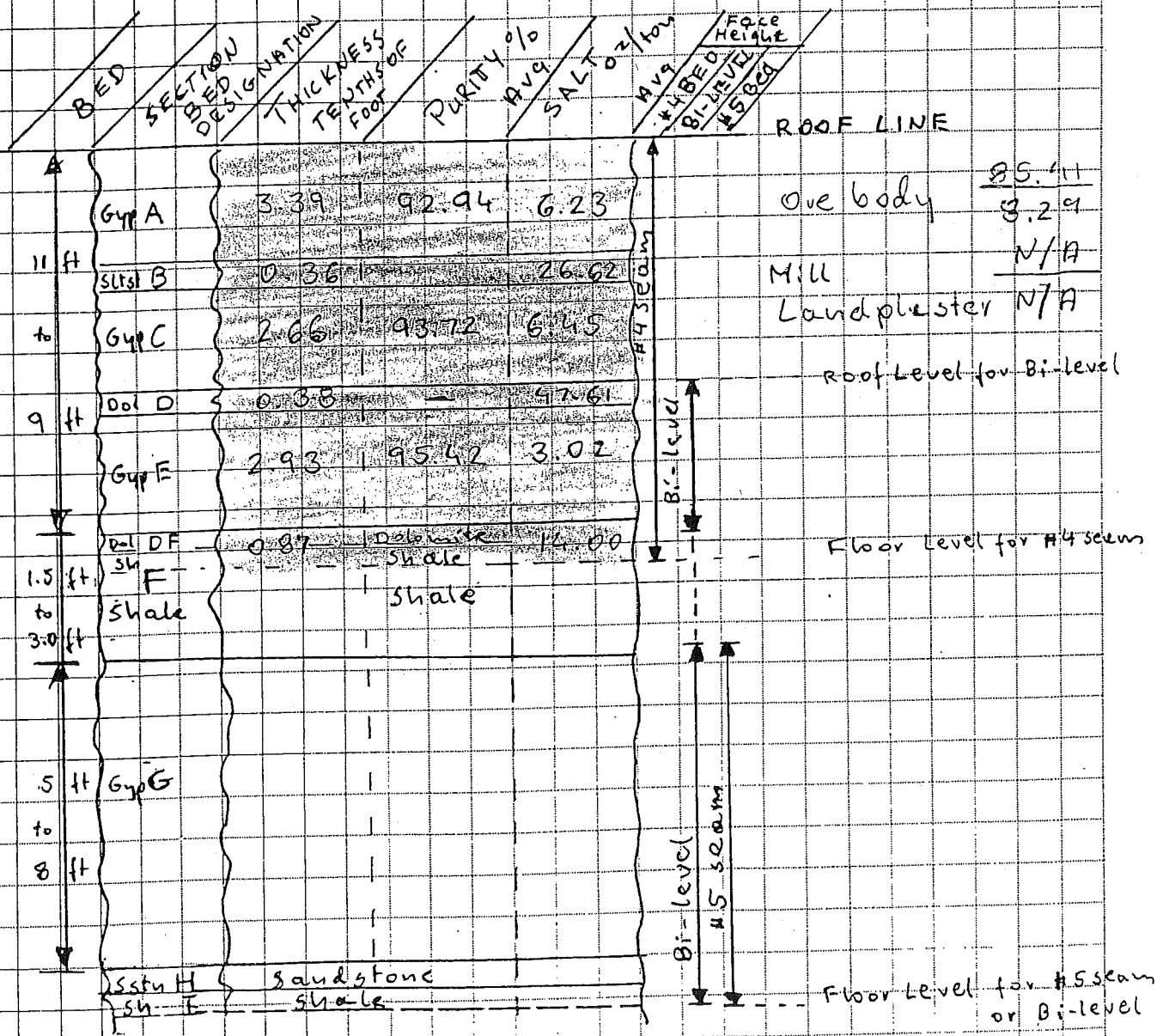


Ovebody 86.50 % 21.24 oz/t

Mill 82.11 % Landplaster 22.21 oz/t

1984 year

Section of Grand Rapids
#4 seam



Ove body 85.41 / 3.2 a

Mill N/A

Landplaster N/A