



1  
00:00:05,240 --> 00:00:03,169  
good afternoon and welcome to NASA's

2  
00:00:07,519 --> 00:00:05,250  
Johnson Space Center here in Houston

3  
00:00:09,379 --> 00:00:07,529  
we're having a briefing today to talk

4  
00:00:11,749 --> 00:00:09,389  
about NASA's assistance to the trapped

5  
00:00:14,180 --> 00:00:11,759  
miners in Chile a team was sent there

6  
00:00:16,670 --> 00:00:14,190  
last week and has returned and can talk

7  
00:00:18,500 --> 00:00:16,680  
about that experience we'll turn it over

8  
00:00:20,269 --> 00:00:18,510  
to the team members we have three here

9  
00:00:22,279 --> 00:00:20,279  
at the Johnson Space Center and also one

10  
00:00:24,109 --> 00:00:22,289  
on the phone line from NASA's Langley

11  
00:00:25,820 --> 00:00:24,119  
Research Center where the NASA

12  
00:00:28,429 --> 00:00:25,830  
engineering and Safety Center is located

13  
00:00:30,980 --> 00:00:28,439

I'll turn it over to the lead of the

14  
00:00:33,709 --> 00:00:30,990  
team who is dr. James dunk James Michael

15  
00:00:35,270 --> 00:00:33,719  
Duncan Michael Duncan served as the lead

16  
00:00:36,889 --> 00:00:35,280  
and he will introduce the rest of the

17  
00:00:38,720 --> 00:00:36,899  
team members he's the deputy chief

18  
00:00:43,040 --> 00:00:38,730  
medical officer here for the Johnson

19  
00:00:44,869 --> 00:00:43,050  
Space Center doctor thanks Callie we had

20  
00:00:48,950 --> 00:00:44,879  
the privilege of being able to travel to

21  
00:00:51,350 --> 00:00:48,960  
Chile as a result of the Chilean

22  
00:00:56,119 --> 00:00:51,360  
government asking through our State

23  
00:00:58,369 --> 00:00:56,129  
Department NASA's input into the rescue

24  
00:01:02,090 --> 00:00:58,379  
effort for the miners that input was

25  
00:01:06,890 --> 00:01:02,100  
primarily related to medical aspects

26

00:01:09,109 --> 00:01:06,900

behavioral health support and also

27

00:01:12,469 --> 00:01:09,119

looking at their is in sanitation and

28

00:01:15,050 --> 00:01:12,479

hygiene and and most importantly or as

29

00:01:22,039 --> 00:01:15,060

importantly nutritional support of the

30

00:01:24,380 --> 00:01:22,049

miners while in Chile we were our

31

00:01:26,929 --> 00:01:24,390

primary interface with with was with the

32

00:01:29,060 --> 00:01:26,939

Minister of Health as well as

33

00:01:33,280 --> 00:01:29,070

representatives from the Chilean Space

34

00:01:35,539 --> 00:01:33,290

Agency who helped get us through the

35

00:01:38,090 --> 00:01:35,549

travels in the country and getting us to

36

00:01:39,859 --> 00:01:38,100

the mine it was a very rewarding

37

00:01:45,109 --> 00:01:39,869

experience for us and that we were able

38

00:01:48,590 --> 00:01:45,119

to say hello to the miners as well as

39

00:01:51,770 --> 00:01:48,600

say hello to the families and get

40

00:01:54,679 --> 00:01:51,780

detailed briefings from the minister of

41

00:01:57,050 --> 00:01:54,689

mining the Minister of Health some of

42

00:02:00,590 --> 00:01:57,060

the mining engineers that were

43

00:02:04,490 --> 00:02:00,600

associated with this rescue effort and

44

00:02:09,350 --> 00:02:04,500

be able to spend three full days at the

45

00:02:12,260 --> 00:02:09,360

mine site being able to evaluate their

46

00:02:14,270 --> 00:02:12,270

operations and understand the medical

47

00:02:15,980 --> 00:02:14,280

here that the miners are receiving as

48

00:02:19,340 --> 00:02:15,990

well as the behavioral health support

49

00:02:21,260 --> 00:02:19,350

for the miners and the families and I

50

00:02:29,420 --> 00:02:21,270

review the status and the nutrition of

51  
00:02:31,790 --> 00:02:29,430  
the miners on the team we had to to

52  
00:02:35,840 --> 00:02:31,800  
physicians myself and dr. JD Polk who's

53  
00:02:37,280 --> 00:02:35,850  
at my far left dr. Polk is the chief of

54  
00:02:40,790 --> 00:02:37,290  
the space medicine division here at

55  
00:02:43,040 --> 00:02:40,800  
Johnson Space Center his expertise is in

56  
00:02:47,020 --> 00:02:43,050  
emergency medicine as well as a medical

57  
00:02:51,170 --> 00:02:47,030  
evacuation in particular Arabic

58  
00:02:53,270 --> 00:02:51,180  
evacuation to my immediate left is dr.

59  
00:02:57,700 --> 00:02:53,280  
al Holland who is a psychologist with us

60  
00:03:01,070 --> 00:02:57,710  
here at Johnson Space Center with a long

61  
00:03:04,070 --> 00:03:01,080  
history of being dealing with our

62  
00:03:05,840 --> 00:03:04,080  
astronauts and families and in doing a

63  
00:03:07,670 --> 00:03:05,850

behavioral support of them getting them

64

00:03:11,270 --> 00:03:07,680

through our long-duration missions on

65

00:03:14,450 --> 00:03:11,280

the space station and the other member

66

00:03:18,380 --> 00:03:14,460

of our team who is on online with us

67

00:03:21,620 --> 00:03:18,390

today is mr. Clint Craig 30 years in the

68

00:03:23,900 --> 00:03:21,630

Navy with a command experience in the

69

00:03:26,570 --> 00:03:23,910

submarine forces in the Navy currently

70

00:03:30,020 --> 00:03:26,580

he is with the NASA engineering and

71

00:03:33,400 --> 00:03:30,030

Safety Center and is a principal

72

00:03:36,770 --> 00:03:33,410

engineer in that organization so let me

73

00:03:39,080 --> 00:03:36,780

turn it over if I may to each of my team

74

00:03:41,630 --> 00:03:39,090

members to also make some brief opening

75

00:03:46,340 --> 00:03:41,640

remarks and I'll ask dr. Holland to

76  
00:03:49,520 --> 00:03:46,350  
begin our experience down there for the

77  
00:03:53,540 --> 00:03:49,530  
few days that we were on site we learned

78  
00:03:57,010 --> 00:03:53,550  
a great deal the miners were in

79  
00:04:00,530 --> 00:03:57,020  
excellent spirits they had done a lot

80  
00:04:03,080 --> 00:04:00,540  
for their own health before they were

81  
00:04:07,790 --> 00:04:03,090  
even found they had organized into

82  
00:04:09,809 --> 00:04:07,800  
groups they had established a hierarchy

83  
00:04:11,459 --> 00:04:09,819  
among themselves and

84  
00:04:14,030 --> 00:04:11,469  
they've done a lot in terms of taking

85  
00:04:16,680 --> 00:04:14,040  
responsibility for their own fate and

86  
00:04:19,860 --> 00:04:16,690  
these are all very positive signs and by

87  
00:04:22,620 --> 00:04:19,870  
the time the rescuers did locate them 17

88  
00:04:25,499 --> 00:04:22,630

days into the confinement they were

89

00:04:28,200 --> 00:04:25,509

still doing well and so the topside

90

00:04:30,330 --> 00:04:28,210

people found that they were doing an

91

00:04:34,020 --> 00:04:30,340

excellent job of supporting the miners

92

00:04:36,050 --> 00:04:34,030

and the miners families and we were able

93

00:04:38,370 --> 00:04:36,060

to have some discussions with our

94

00:04:40,320 --> 00:04:38,380

counterparts in my case with the

95

00:04:43,980 --> 00:04:40,330

coordinating psychologists down there

96

00:04:48,810 --> 00:04:43,990

and we're very fruitful discussions

97

00:04:51,749 --> 00:04:48,820

covered a wide range of topics and I

98

00:04:56,339 --> 00:04:51,759

left with the sense that they had a very

99

00:04:58,110 --> 00:04:56,349

capable competent determined team on the

100

00:05:05,189 --> 00:04:58,120

topside to assist the families of the

101  
00:05:10,020 --> 00:05:05,199  
miners and he turned over to dr. pol for

102  
00:05:12,529 --> 00:05:10,030  
his comments about medical aspects this

103  
00:05:16,770 --> 00:05:12,539  
was this is an operation that's probably

104  
00:05:19,640 --> 00:05:16,780  
unprecedented in scope never have so

105  
00:05:24,060 --> 00:05:19,650  
many been trapped for so long so deeply

106  
00:05:25,890 --> 00:05:24,070  
we were very impressed with not only how

107  
00:05:28,050 --> 00:05:25,900  
the Chilean government has responded to

108  
00:05:30,330 --> 00:05:28,060  
this incident but also the the medical

109  
00:05:33,860 --> 00:05:30,340  
care specifically they've done a great

110  
00:05:36,930 --> 00:05:33,870  
deal of thought into the care there are

111  
00:05:39,510 --> 00:05:36,940  
specific intricacies both in refeeding

112  
00:05:41,870 --> 00:05:39,520  
people that have been starving as well

113  
00:05:44,159 --> 00:05:41,880

as rescuing people from this location

114

00:05:48,330 --> 00:05:44,169

and they have given a great deal of

115

00:05:52,230 --> 00:05:48,340

thought to each one of these facets and

116

00:05:56,580 --> 00:05:52,240

we were very impressed with the actions

117

00:05:58,740 --> 00:05:56,590

by the medical team and it was a very

118

00:06:00,830 --> 00:05:58,750

collegial experience as we went down

119

00:06:04,020 --> 00:06:00,840

there they were very receptive of our

120

00:06:06,409 --> 00:06:04,030

recommendations in our consultation but

121

00:06:10,320 --> 00:06:06,419

it was very much colleague to colleague

122

00:06:16,320 --> 00:06:10,330

and the operation itself is very

123

00:06:18,600 --> 00:06:16,330

impressive thanks JD and the last member

124

00:06:21,730 --> 00:06:18,610

of the team Clint Craig some opening

125

00:06:26,360 --> 00:06:23,149

thanks Mike

126

00:06:29,420 --> 00:06:26,370

yes this is Clint Craig one of my jobs

127

00:06:31,850 --> 00:06:29,430

on this RV job for me during this

128

00:06:35,179 --> 00:06:31,860

mission was to support the doctors and

129

00:06:38,029 --> 00:06:35,189

any engineering aspects of issues that

130

00:06:41,409 --> 00:06:38,039

they might might have discovered down

131

00:06:43,790 --> 00:06:41,419

there I had an opportunity to spend

132

00:06:46,490 --> 00:06:43,800

quite some time with the mining

133

00:06:49,429 --> 00:06:46,500

engineers that were working the problem

134

00:06:52,040 --> 00:06:49,439

down there as well as one of the key

135

00:06:53,709 --> 00:06:52,050

leaders of the site who himself was also

136

00:06:56,540 --> 00:06:53,719

a submariner

137

00:06:59,080 --> 00:06:56,550

my feeling is as they are are really

138

00:07:01,850 --> 00:06:59,090

doing well in this entire rescue effort

139

00:07:05,990 --> 00:07:01,860

that they've got the right attitudes as

140

00:07:10,010 --> 00:07:06,000

team spirit down there is is incredibly

141

00:07:12,610 --> 00:07:10,020

high and I think they're going to sort

142

00:07:16,820 --> 00:07:12,620

everything out and look in the long-term

143

00:07:18,170 --> 00:07:16,830

that's all I got Mike thanks great and I

144

00:07:20,959 --> 00:07:18,180

think it's important for us to remember

145

00:07:25,360 --> 00:07:20,969

here that the chileans call this

146

00:07:28,369 --> 00:07:25,370

operation San Lorenzo Saint Lorenzo is

147

00:07:31,159 --> 00:07:28,379

the patron saint of the miners as we

148

00:07:34,719 --> 00:07:31,169

were told this is really not about NASA

149

00:07:36,379 --> 00:07:34,729

we're a pretty small part in the overall

150

00:07:38,899 --> 00:07:36,389

operation

151

00:07:42,050 --> 00:07:38,909

the Chilean's were interested in our

152

00:07:45,649 --> 00:07:42,060

input and are also obtaining input from

153

00:07:48,189 --> 00:07:45,659

other sources to make sure that they are

154

00:07:51,529 --> 00:07:48,199

doing everything possible for the miners

155

00:07:53,719 --> 00:07:51,539

and it is indeed about the miners and

156

00:07:58,100 --> 00:07:53,729

the Chilean effort to make this a

157

00:08:00,050 --> 00:07:58,110

successful rescue with that we'll start

158

00:08:01,879 --> 00:08:00,060

with the question and answer part of the

159

00:08:03,589 --> 00:08:01,889

briefing we'll start here at the Johnson

160

00:08:05,959 --> 00:08:03,599

Space Center locally in other NASA

161

00:08:08,300 --> 00:08:05,969

centers and also on the line you could

162

00:08:09,709 --> 00:08:08,310

please direct your question to one of

163

00:08:12,950 --> 00:08:09,719

the briefers that possible and state

164

00:08:15,079 --> 00:08:12,960

your name and affiliation thank you

165

00:08:16,850 --> 00:08:15,089

mark carro representing Aviation Week

166

00:08:19,159 --> 00:08:16,860

and space technology and I think my

167

00:08:22,879 --> 00:08:19,169

questions for dr. Duncan but please feel

168

00:08:25,010 --> 00:08:22,889

free to share as you need I'm wondering

169

00:08:27,200 --> 00:08:25,020

what happens now in terms of NASA

170

00:08:29,719 --> 00:08:27,210

involvement well you have long-running

171

00:08:31,490 --> 00:08:29,729

will you follow the events will you be

172

00:08:33,890 --> 00:08:31,500

available to them

173

00:08:36,380 --> 00:08:33,900

and explain if you are kind of how that

174

00:08:41,360 --> 00:08:36,390

is if it's by phone or teleconference or

175

00:08:44,720 --> 00:08:41,370

if you'll be going back sure we hope to

176  
00:08:47,660 --> 00:08:44,730  
have continued working relationship with

177  
00:08:49,880 --> 00:08:47,670  
the individuals that we met down there

178  
00:08:53,590 --> 00:08:49,890  
I think the physicians and the

179  
00:08:56,720 --> 00:08:53,600  
psychologists were very receptive to

180  
00:08:59,360 --> 00:08:56,730  
wanting to have continued discussions

181  
00:09:02,210 --> 00:08:59,370  
with us and an input this is going to be

182  
00:09:03,890 --> 00:09:02,220  
a very dynamic situation for a long

183  
00:09:06,650 --> 00:09:03,900  
period of time and I'm sure they'll have

184  
00:09:09,050 --> 00:09:06,660  
questions and want to bounce ideas off

185  
00:09:13,670 --> 00:09:09,060  
of us some things that that we've

186  
00:09:15,470 --> 00:09:13,680  
learned you know that communication in

187  
00:09:20,210 --> 00:09:15,480  
this day and age can occur in any number

188  
00:09:25,730 --> 00:09:20,220

of ways through electronic means email

189

00:09:29,090 --> 00:09:25,740

phone those types of things and you know

190

00:09:30,710 --> 00:09:29,100

as far as any return trip at this point

191

00:09:34,220 --> 00:09:30,720

the Chilean's have not asked us to

192

00:09:36,830 --> 00:09:34,230

return I'm sure if that type of request

193

00:09:39,230 --> 00:09:36,840

came through we would give it you know

194

00:09:41,810 --> 00:09:39,240

it's due consideration and go from there

195

00:09:43,730 --> 00:09:41,820

and maybe owl would have some additional

196

00:09:47,000 --> 00:09:43,740

thoughts with regards to you know

197

00:09:50,120 --> 00:09:47,010

continued communication yeah I think

198

00:09:52,930 --> 00:09:50,130

that from the psychological point of

199

00:09:57,620 --> 00:09:52,940

view we'll be in pretty continuous

200

00:10:00,290 --> 00:09:57,630

communication at their initiative with

201  
00:10:02,900 --> 00:10:00,300  
the psychological folks there because

202  
00:10:05,740 --> 00:10:02,910  
like Mike said it is a it's a very

203  
00:10:09,620 --> 00:10:05,750  
dynamic situation and over time

204  
00:10:11,720 --> 00:10:09,630  
individuals and groups change and so

205  
00:10:15,650 --> 00:10:11,730  
their situation will change events will

206  
00:10:17,870 --> 00:10:15,660  
occur and there'll be opportunities to

207  
00:10:22,960 --> 00:10:17,880  
talk so I'm sure we'll be doing at least

208  
00:10:26,300 --> 00:10:22,970  
telecon I might ask a follow-up question

209  
00:10:28,370 --> 00:10:26,310  
I'm interested in I don't want to make

210  
00:10:30,830 --> 00:10:28,380  
this sound like quid pro quo but I'm

211  
00:10:34,580 --> 00:10:30,840  
sort of wondering if there's if if

212  
00:10:37,220 --> 00:10:34,590  
NASA's participation in this event would

213  
00:10:41,150 --> 00:10:37,230

allow you to draw something of benefit

214

00:10:44,330 --> 00:10:41,160

to future space missions

215

00:10:45,049 --> 00:10:44,340

I don't know one I mean one sort of on

216

00:10:48,019 --> 00:10:45,059

the surface

217

00:10:51,229 --> 00:10:48,029

this is a bit of a Apollo 13 on the

218

00:10:54,499 --> 00:10:51,239

ground and thank goodness that hasn't

219

00:10:56,029 --> 00:10:54,509

happened here for a long time but I just

220

00:10:58,339 --> 00:10:56,039

wonder if there are lessons to be

221

00:11:02,259 --> 00:10:58,349

learned that NASA could draw from this

222

00:11:04,569 --> 00:11:02,269

tragedy I think it's certainly possible

223

00:11:07,879 --> 00:11:04,579

you know as we go along

224

00:11:11,779 --> 00:11:07,889

understanding what what dynamics develop

225

00:11:15,489 --> 00:11:11,789

in this particular situation of 33

226

00:11:19,309 --> 00:11:15,499

miners in a very isolated environment

227

00:11:21,619 --> 00:11:19,319

you know will be I think learning along

228

00:11:23,089 --> 00:11:21,629

with the chileans on how to approach

229

00:11:27,399 --> 00:11:23,099

these things there are some things that

230

00:11:34,399 --> 00:11:29,709

experience and long-duration research

231

00:11:36,919 --> 00:11:34,409

that you know we can you know maybe help

232

00:11:40,849 --> 00:11:36,929

them predict some things to to be

233

00:11:43,399 --> 00:11:40,859

expecting and then you know at the

234

00:11:45,979 --> 00:11:43,409

conclusion of all this I'm sure we will

235

00:11:48,319 --> 00:11:45,989

be reviewing some lessons learned and

236

00:11:51,229 --> 00:11:48,329

gleaning from that you know anything

237

00:11:56,449 --> 00:11:51,239

that might be useful to us and dealing

238

00:11:58,189 --> 00:11:56,459

with isolated environments hi with the

239

00:12:00,109 --> 00:11:58,199

Houston Chronicle thanks for for doing

240

00:12:01,969 --> 00:12:00,119

this today I've got a couple questions

241

00:12:04,059 --> 00:12:01,979

the first one I think is for dr. Duncan

242

00:12:07,009 --> 00:12:04,069

maybe you could talk a little bit about

243

00:12:08,389 --> 00:12:07,019

you mentioned and the other the other

244

00:12:09,649 --> 00:12:08,399

panel members mentioned they did a lot

245

00:12:11,119 --> 00:12:09,659

of listening maybe you could talk a

246

00:12:12,049 --> 00:12:11,129

little bit about some of the specific

247

00:12:14,419 --> 00:12:12,059

piece of vision

248

00:12:17,359 --> 00:12:14,429

pieces of it pieces of advice that you

249

00:12:18,649 --> 00:12:17,369

provided or sort of guidance you gave

250

00:12:21,829 --> 00:12:18,659

them in terms of dealing with this

251  
00:12:26,899 --> 00:12:21,839  
situation okay I think one of the things

252  
00:12:29,959 --> 00:12:26,909  
that struck us initially when we first

253  
00:12:35,929 --> 00:12:29,969  
received the briefing from the our

254  
00:12:39,019 --> 00:12:35,939  
Chilean counterparts is that it was they

255  
00:12:41,209 --> 00:12:39,029  
were looking towards the rescue as is

256  
00:12:44,629 --> 00:12:41,219  
actually physically getting the miners

257  
00:12:47,559 --> 00:12:44,639  
out of the mine and and we brought to

258  
00:12:52,459 --> 00:12:47,569  
their attention our experience and and

259  
00:12:54,499 --> 00:12:52,469  
the experience of others that really the

260  
00:12:55,460 --> 00:12:54,509  
work is just beginning when the miners

261  
00:12:59,950 --> 00:12:55,470  
come out of the mine

262  
00:13:02,450 --> 00:12:59,960  
because there's a lot of rehabilitation

263  
00:13:04,400 --> 00:13:02,460

recovery that the miners will have to go

264

00:13:07,310 --> 00:13:04,410

through there is you know a

265

00:13:09,500 --> 00:13:07,320

reintroduction of the miner to the

266

00:13:12,620 --> 00:13:09,510

family there's reintroduction of the

267

00:13:16,250 --> 00:13:12,630

miner to society and you know when these

268

00:13:19,400 --> 00:13:16,260

miners come out they will in their own

269

00:13:20,810 --> 00:13:19,410

right have a certain celebrity status

270

00:13:23,300 --> 00:13:20,820

within their country

271

00:13:29,470 --> 00:13:23,310

and there will be a lot of pressures put

272

00:13:33,530 --> 00:13:29,480

upon them by the society the media

273

00:13:38,480 --> 00:13:33,540

others wanting you know part of their

274

00:13:40,520 --> 00:13:38,490

time and I think the chileans had not

275

00:13:44,690 --> 00:13:40,530

gotten to that point of thinking how

276

00:13:46,940 --> 00:13:44,700

difficult this post rescue effort is

277

00:13:49,360 --> 00:13:46,950

going to be and that's one of the

278

00:13:53,600 --> 00:13:49,370

biggest things that that we help bring

279

00:13:54,950 --> 00:13:53,610

their attention to let me ask some of

280

00:13:57,380 --> 00:13:54,960

the other panel members if you don't

281

00:14:02,720 --> 00:13:57,390

mind to make some comment and I'll ask

282

00:14:05,900 --> 00:14:02,730

Alda to start well this is certainly a

283

00:14:10,130 --> 00:14:05,910

new thing for them so and for all of us

284

00:14:13,670 --> 00:14:10,140

actually but I think some of the areas

285

00:14:16,220 --> 00:14:13,680

that we did discuss in depth was the

286

00:14:20,960 --> 00:14:16,230

circadian rhythm circadian cycle

287

00:14:22,070 --> 00:14:20,970

sleep/wake cycles and how some

288

00:14:24,910 --> 00:14:22,080

entrainment are a little bit more

289

00:14:26,630 --> 00:14:24,920

lighting systematic way of lighting

290

00:14:30,530 --> 00:14:26,640

scheduling light and dark down there

291

00:14:33,830 --> 00:14:30,540

would benefit their mood and their sleep

292

00:14:37,850 --> 00:14:33,840

and the social stability we also talked

293

00:14:39,740 --> 00:14:37,860

about training and content for training

294

00:14:41,720 --> 00:14:39,750

for the miners and for the family

295

00:14:44,780 --> 00:14:41,730

members as time goes by so that they

296

00:14:47,270 --> 00:14:44,790

know what to expect in long duration

297

00:14:51,050 --> 00:14:47,280

confinement and they know what to expect

298

00:14:54,560 --> 00:14:51,060

upon coming out and how best to support

299

00:14:56,780 --> 00:14:54,570

one another along the way we talked at

300

00:15:00,140 --> 00:14:56,790

length about the post extraction time

301  
00:15:01,940 --> 00:15:00,150  
and ways to protect the miners and the

302  
00:15:04,850 --> 00:15:01,950  
families both medically and

303  
00:15:05,929 --> 00:15:04,860  
psychologically during the first 24 to

304  
00:15:10,869 --> 00:15:05,939  
48 hours

305  
00:15:14,749 --> 00:15:10,879  
post extraction we talked about the

306  
00:15:17,629 --> 00:15:14,759  
desirability of having more than a one

307  
00:15:19,549 --> 00:15:17,639  
deep organization or in places where

308  
00:15:21,710 --> 00:15:19,559  
there are only one deep to have a backup

309  
00:15:23,329 --> 00:15:21,720  
and an alternate person who can be

310  
00:15:25,999 --> 00:15:23,339  
working issues so they can rotate the

311  
00:15:28,129 --> 00:15:26,009  
topside people I think in in general

312  
00:15:31,569 --> 00:15:28,139  
like Mike was saying there was a great

313  
00:15:34,969 --> 00:15:31,579

focus on the immediacy of the need to

314

00:15:38,899 --> 00:15:34,979

bring the people out of the mind and

315

00:15:41,629 --> 00:15:38,909

actually now they're beginning to adjust

316

00:15:44,359 --> 00:15:41,639

their thinking the miners perhaps are

317

00:15:47,659 --> 00:15:44,369

leading the way but the families the

318

00:15:49,039 --> 00:15:47,669

Chilean topside rescue personnel in the

319

00:15:53,569 --> 00:15:49,049

country down there I think it's

320

00:15:56,859 --> 00:15:53,579

beginning to shift its mindset to one of

321

00:15:59,059 --> 00:15:56,869

a marathon run rather than a sprint and

322

00:16:02,019 --> 00:15:59,069

marathons as you know have very

323

00:16:06,079 --> 00:16:02,029

different pacing have a very different

324

00:16:08,839 --> 00:16:06,089

set of strategies than a sprint does and

325

00:16:14,509 --> 00:16:08,849

so we talked at length about about those

326

00:16:18,439 --> 00:16:14,519

types of things was maybe for for dr.

327

00:16:19,969 --> 00:16:18,449

Holland or or for dr. Polk maybe just

328

00:16:21,499 --> 00:16:19,979

talk about what are some of the analogs

329

00:16:22,939 --> 00:16:21,509

between what they're going through and

330

00:16:30,289 --> 00:16:22,949

what astronauts might be going through

331

00:16:33,969 --> 00:16:30,299

in long-term spaceflight well yeah the

332

00:16:36,259 --> 00:16:33,979

seclusion folks for a long duration

333

00:16:38,359 --> 00:16:36,269

whether that's in a sub whether that's

334

00:16:40,339 --> 00:16:38,369

in the Antarctic whether that's on the

335

00:16:43,759 --> 00:16:40,349

space station that's certainly one thing

336

00:16:46,099 --> 00:16:43,769

that they're there in common where they

337

00:16:47,659 --> 00:16:46,109

differ is that in most of our analogs we

338

00:16:50,210 --> 00:16:47,669

have good communication we have good

339

00:16:53,809 --> 00:16:50,220

logistics and resupply it took a while

340

00:16:56,119 --> 00:16:53,819

to get to those things to the miners the

341

00:16:58,489 --> 00:16:56,129

miners fortunately is as Ali looted to

342

00:17:01,399 --> 00:16:58,499

or the masters of their own fate because

343

00:17:04,189 --> 00:17:01,409

of their their leadership and their own

344

00:17:06,529 --> 00:17:04,199

instincts and willing to survive they

345

00:17:08,829 --> 00:17:06,539

were able to sustain themselves for

346

00:17:11,480 --> 00:17:08,839

about 2 plus weeks until they were found

347

00:17:14,659 --> 00:17:11,490

that's unprecedented

348

00:17:17,929 --> 00:17:14,669

and you know those those types of skills

349

00:17:19,289 --> 00:17:17,939

certainly will be needed whether it's

350

00:17:21,659 --> 00:17:19,299

exploration whether it's in

351

00:17:23,189 --> 00:17:21,669

arctic weather it's undersea will

352

00:17:25,470 --> 00:17:23,199

certainly certainly learn as much from

353

00:17:29,999 --> 00:17:25,480

the miners as they are learning from us

354

00:17:32,279 --> 00:17:30,009

from our past experiences as I alluded

355

00:17:34,340 --> 00:17:32,289

to with the marathon one of the things

356

00:17:36,479 --> 00:17:34,350

that was beneficial I think for the

357

00:17:39,479 --> 00:17:36,489

Chilean government was to break this

358

00:17:42,899 --> 00:17:39,489

into phases and we broke this into five

359

00:17:46,979 --> 00:17:42,909

phases the incident phase the initial

360

00:17:49,789 --> 00:17:46,989

survival phase a sustainment phase the

361

00:17:52,529 --> 00:17:49,799

rescue phase and then the recovery phase

362

00:17:54,509 --> 00:17:52,539

and each of those phases have their own

363

00:17:56,999 --> 00:17:54,519

distinct requirements their own distinct

364

00:18:00,210 --> 00:17:57,009

problems their own distinct set of

365

00:18:03,989 --> 00:18:00,220

challenges that the Chileans have to

366

00:18:05,789 --> 00:18:03,999

gear up for and each of those will

367

00:18:09,119 --> 00:18:05,799

require different talents and different

368

00:18:12,379 --> 00:18:09,129

skill sets and so it's looking at that

369

00:18:14,970 --> 00:18:12,389

mission across a broad range of phases

370

00:18:17,249 --> 00:18:14,980

not only help such lands but helps us

371

00:18:21,899 --> 00:18:17,259

for for future exploration missions as

372

00:18:23,580 --> 00:18:21,909

well Carl Willis with KPRC one of the

373

00:18:24,899 --> 00:18:23,590

the greatest moments that we saw was

374

00:18:26,580 --> 00:18:24,909

these miners being able to

375

00:18:28,649 --> 00:18:26,590

teleconference with their loved ones

376

00:18:32,249 --> 00:18:28,659

while they're down there can you tell us

377

00:18:35,580 --> 00:18:32,259

how important or what kind of impact

378

00:18:39,989 --> 00:18:35,590

that human contact can have in surviving

379

00:18:47,399 --> 00:18:45,269

clearly it's essential the contact that

380

00:18:49,649 --> 00:18:47,409

you have with your your social support

381

00:18:51,899 --> 00:18:49,659

system your loved ones as we all know is

382

00:18:55,279 --> 00:18:51,909

essential for us going through any

383

00:19:00,419 --> 00:18:55,289

hardship but for their hardship which is

384

00:19:03,210 --> 00:19:00,429

severe it's extremely essential so

385

00:19:04,889 --> 00:19:03,220

regular contact on a regular basis so

386

00:19:06,720 --> 00:19:04,899

that there's something they can expect

387

00:19:08,700 --> 00:19:06,730

for instance on a weekend they can

388

00:19:10,409 --> 00:19:08,710

expect that on Saturday they'll have a

389

00:19:11,899 --> 00:19:10,419

chance to talk with their loved one it's

390

00:19:15,470 --> 00:19:11,909

really good to have these expectations

391

00:19:19,680 --> 00:19:15,480

give them something to look forward to

392

00:19:21,989 --> 00:19:19,690

there's also care in that excessive

393

00:19:25,109 --> 00:19:21,999

communication can be problematic believe

394

00:19:27,480 --> 00:19:25,119

it or not if there's too much

395

00:19:30,060 --> 00:19:27,490

communication all the time then

396

00:19:31,259 --> 00:19:30,070

sometimes people have difficulty

397

00:19:32,370 --> 00:19:31,269

adjusting to where they are and they

398

00:19:36,030 --> 00:19:32,380

feel like they need to

399

00:19:40,530 --> 00:19:36,040

take on the responsibilities of topside

400

00:19:42,030 --> 00:19:40,540

if they're a minor or the people topside

401  
00:19:44,010 --> 00:19:42,040  
feel like they have to take on and help

402  
00:19:45,660 --> 00:19:44,020  
solve problems for the miners the

403  
00:19:47,790 --> 00:19:45,670  
individual up went down in the mind

404  
00:19:50,220 --> 00:19:47,800  
themselves and so it's a little bit

405  
00:19:52,320 --> 00:19:50,230  
excessive it's like any other analog

406  
00:19:55,020 --> 00:19:52,330  
situation on earth when you would go

407  
00:19:56,460 --> 00:19:55,030  
somewhere communications important

408  
00:20:00,420 --> 00:19:56,470  
essential for your support your

409  
00:20:02,610 --> 00:20:00,430  
emotional sustenance but at the same

410  
00:20:04,110 --> 00:20:02,620  
time a little bit of distance enables

411  
00:20:05,970 --> 00:20:04,120  
you to solve the problems where you are

412  
00:20:07,560 --> 00:20:05,980  
and it allows the other person to take

413  
00:20:11,640 --> 00:20:07,570

responsibility and solve the problems

414

00:20:12,810 --> 00:20:11,650

where they are something I read

415

00:20:15,030 --> 00:20:12,820

somewhere about the strict

416

00:20:17,220 --> 00:20:15,040

organizational structure that was kind

417

00:20:20,220 --> 00:20:17,230

of implemented down there can you kind

418

00:20:23,430 --> 00:20:20,230

of tell us what kind of things were not

419

00:20:29,160 --> 00:20:23,440

allowed what things were were frowned

420

00:20:31,320 --> 00:20:29,170

upon what things were permitted during

421

00:20:35,250 --> 00:20:31,330

the period of time when the miners had

422

00:20:38,100 --> 00:20:35,260

no contact topside and they were you

423

00:20:43,170 --> 00:20:38,110

know working on their own to survive the

424

00:20:46,440 --> 00:20:43,180

miners for that shift they had a lead

425

00:20:49,470 --> 00:20:46,450

that that lead then established you know

426

00:20:52,500 --> 00:20:49,480

jobs and lead areas for other other

427

00:20:56,250 --> 00:20:52,510

miners within the group and jobs for for

428

00:20:59,970 --> 00:20:56,260

everyone to do and and and establish

429

00:21:03,990 --> 00:20:59,980

shifts so you know it was you know very

430

00:21:07,890 --> 00:21:04,000

important for them to you know to do

431

00:21:11,550 --> 00:21:07,900

that and to survive to the point for

432

00:21:14,490 --> 00:21:11,560

when they were found now you know

433

00:21:19,050 --> 00:21:14,500

there's there's more support topside we

434

00:21:23,400 --> 00:21:19,060

have you know things that that need to

435

00:21:29,040 --> 00:21:23,410

be done to you know sustain them food

436

00:21:32,600 --> 00:21:29,050

resupply supply of stores in case for

437

00:21:37,020 --> 00:21:32,610

some reason communication and access

438

00:21:40,260 --> 00:21:37,030

through these long tubes is blocked for

439

00:21:44,370 --> 00:21:40,270

some reason and so you know there's a

440

00:21:47,830 --> 00:21:44,380

there's a number of jobs that

441

00:21:49,720 --> 00:21:47,840

that we you know are having or the

442

00:21:52,090 --> 00:21:49,730

Chilean's I should say are having them

443

00:21:56,320 --> 00:21:52,100

do as far as things that were not

444

00:21:59,680 --> 00:21:56,330

allowed I mean there were you know some

445

00:22:03,100 --> 00:21:59,690

requests for a save is smoking for

446

00:22:06,010 --> 00:22:03,110

example most of the miners as we

447

00:22:09,760 --> 00:22:06,020

understand it do smoke given the

448

00:22:13,480 --> 00:22:09,770

confined conditions and the low

449

00:22:15,520 --> 00:22:13,490

atmospheric turnover of the chamber that

450

00:22:20,050 --> 00:22:15,530

they're in we did not feel that that was

451  
00:22:23,230 --> 00:22:20,060  
a good situation in addition that the

452  
00:22:25,960 --> 00:22:23,240  
mine conditions have been fairly dusty

453  
00:22:28,270 --> 00:22:25,970  
and so from from a lung standpoint we

454  
00:22:36,750 --> 00:22:28,280  
didn't want to add additional insults

455  
00:22:39,700 --> 00:22:36,760  
you know for their health but you know I

456  
00:22:43,180 --> 00:22:39,710  
think with you know their team that

457  
00:22:46,660 --> 00:22:43,190  
counseled the miners that that they

458  
00:22:48,370 --> 00:22:46,670  
needed to to work together and so you

459  
00:22:50,980 --> 00:22:48,380  
know it would be frowned upon to have

460  
00:22:53,500 --> 00:22:50,990  
just somebody going off on their own

461  
00:22:56,290 --> 00:22:53,510  
doing something you know without

462  
00:22:58,080 --> 00:22:56,300  
coordination with the group but I'm not

463  
00:23:01,330 --> 00:22:58,090

thinking that there were any other

464

00:23:07,120 --> 00:23:01,340

restrictions of maybe AI has some other

465

00:23:11,530 --> 00:23:07,130

thoughts on yes alcohol is a restriction

466

00:23:15,520 --> 00:23:11,540

but just another or along the same lines

467

00:23:17,350 --> 00:23:15,530

the miners organized themselves it

468

00:23:20,350 --> 00:23:17,360

wasn't a strict hierarchy imposed from

469

00:23:22,600 --> 00:23:20,360

the top and that's the best way to have

470

00:23:24,580 --> 00:23:22,610

it come has come these things come up

471

00:23:27,880 --> 00:23:24,590

from the mining group themselves in the

472

00:23:32,020 --> 00:23:27,890

topside people support these efforts to

473

00:23:34,180 --> 00:23:32,030

organize themselves in the return return

474

00:23:37,390 --> 00:23:34,190

turn an abnormal situation down there

475

00:23:40,680 --> 00:23:37,400

into a more normal situation regular

476  
00:23:43,600 --> 00:23:40,690  
times of day where you have meals etc

477  
00:23:46,270 --> 00:23:43,610  
that provides a sense of normality and

478  
00:23:48,820 --> 00:23:46,280  
so I think the topside is suggesting

479  
00:23:51,940 --> 00:23:48,830  
ways they can do that and advising them

480  
00:23:55,180 --> 00:23:51,950  
in ways but as much as possible they're

481  
00:23:55,740 --> 00:23:55,190  
trying to preserve the miners initiative

482  
00:23:58,799 --> 00:23:55,750  
on this

483  
00:24:03,000 --> 00:23:58,809  
and from the thanks out for the reminder

484  
00:24:05,279 --> 00:24:03,010  
from we did you know make the suggestion

485  
00:24:08,120 --> 00:24:05,289  
that alcohol probably wasn't in their

486  
00:24:10,230 --> 00:24:08,130  
best interest at this at this moment

487  
00:24:13,320 --> 00:24:10,240  
first of all from a nutritional

488  
00:24:16,890 --> 00:24:13,330

standpoint we have we have to get their

489

00:24:19,500 --> 00:24:16,900

nutrition nutritional status back up to

490

00:24:21,299 --> 00:24:19,510

to protect their health and we didn't

491

00:24:23,690 --> 00:24:21,309

want alcohol to interfere with that and

492

00:24:27,960 --> 00:24:23,700

also just like in the flight environment

493

00:24:30,690 --> 00:24:27,970

you know our you don't want to have you

494

00:24:35,460 --> 00:24:30,700

know alcohol or other medications that

495

00:24:37,080 --> 00:24:35,470

that might alter the individuals

496

00:24:39,720 --> 00:24:37,090

response especially in emergency

497

00:24:47,039 --> 00:24:39,730

circumstances so you know our preference

498

00:24:48,750 --> 00:24:47,049

was not to see that occur thirty-nine

499

00:24:50,399 --> 00:24:48,760

question for you where do they stand

500

00:24:52,789 --> 00:24:50,409

right now as far as the rescues

501  
00:24:55,799 --> 00:24:52,799  
concerned I understand there's drills

502  
00:24:56,970 --> 00:24:55,809  
being done but what is the prospering I

503  
00:25:00,990 --> 00:24:56,980  
don't know if you mentioned yet it or

504  
00:25:05,159 --> 00:25:01,000  
not right now I understand it's gonna be

505  
00:25:06,899 --> 00:25:05,169  
months before they can actually be you

506  
00:25:09,600 --> 00:25:06,909  
know for the absolute detail on that

507  
00:25:12,750 --> 00:25:09,610  
it's probably best to ask the Chilean

508  
00:25:15,840 --> 00:25:12,760  
engineers that are responsible but our

509  
00:25:19,470 --> 00:25:15,850  
understanding is that there's still you

510  
00:25:22,020 --> 00:25:19,480  
know you know months away from you know

511  
00:25:24,570 --> 00:25:22,030  
from the rescue they have three plans

512  
00:25:27,180 --> 00:25:24,580  
that they are trying to put into work

513  
00:25:30,330 --> 00:25:27,190

one plan is to drill a vertical hole

514

00:25:32,820 --> 00:25:30,340

that is in progress at the time that we

515

00:25:38,549 --> 00:25:32,830

left on Saturday morning that hole was

516

00:25:39,210 --> 00:25:38,559

about 40-some meters deep as I recall it

517

00:25:42,419 --> 00:25:39,220

is a

518

00:25:46,649 --> 00:25:42,429

a slow process and will take many weeks

519

00:25:50,130 --> 00:25:46,659

for that drill to get down to the miners

520

00:25:55,490 --> 00:25:50,140

the hole size is about 26 inches in

521

00:25:58,649 --> 00:25:55,500

diameter they do have two other plans

522

00:26:02,120 --> 00:25:58,659

another hole to be drilled they're all

523

00:26:05,669 --> 00:26:02,130

about approximately the same diameter

524

00:26:07,030 --> 00:26:05,679

two of the two of the three plans will

525

00:26:10,640 --> 00:26:07,040

leave

526

00:26:13,990 --> 00:26:10,650

we'll be without any casing within the

527

00:26:17,810 --> 00:26:14,000

shaft and the third plan is actually a

528

00:26:20,660 --> 00:26:17,820

as we understand it a petroleum drilling

529

00:26:25,070 --> 00:26:20,670

rig that will actually drill this sized

530

00:26:30,200 --> 00:26:25,080

hole and have a steel casing that will

531

00:26:34,610 --> 00:26:30,210

be laid down as the hole is drilled also

532

00:26:37,100 --> 00:26:34,620

as we understand it the this third plan

533

00:26:42,100 --> 00:26:37,110

plan see as they call it by the

534

00:26:46,010 --> 00:26:42,110

petroleum rig it is actually a faster

535

00:26:48,770 --> 00:26:46,020

drilling process but it will take them

536

00:26:51,530 --> 00:26:48,780

several weeks to actually get it on site

537

00:26:55,420 --> 00:26:51,540

and assemble it before it's you know

538

00:26:58,070 --> 00:26:55,430

ready to begin drilling so there will be

539

00:27:00,410 --> 00:26:58,080

they have all three of these plans put

540

00:27:03,500 --> 00:27:00,420

together so that whichever plan arrives

541

00:27:06,950 --> 00:27:03,510

at the chamber first the others will

542

00:27:13,220 --> 00:27:06,960

then be continued to drill as as backup

543

00:27:15,920 --> 00:27:13,230

rescue tubes hi I'm Marian Helen house

544

00:27:19,610 --> 00:27:15,930

and I'm with the Bay Area citizen there

545

00:27:21,410 --> 00:27:19,620

are two questions first could you be

546

00:27:24,410 --> 00:27:21,420

more specific on the nutritional and

547

00:27:26,630 --> 00:27:24,420

medical supplies and the challenges of

548

00:27:28,850 --> 00:27:26,640

getting them down there I understand

549

00:27:30,350 --> 00:27:28,860

there's a they call it the Dove it's

550

00:27:33,470 --> 00:27:30,360

like the tube that goes down and it's

551  
00:27:40,070 --> 00:27:33,480  
very narrow literal translation but they

552  
00:27:41,990 --> 00:27:40,080  
call it Paloma PL p al oh ma okay and

553  
00:27:44,210 --> 00:27:42,000  
can you just describe in more detail

554  
00:27:47,810 --> 00:27:44,220  
about those nutritional and medical and

555  
00:27:49,700 --> 00:27:47,820  
another the advice that you were giving

556  
00:27:52,310 --> 00:27:49,710  
them about that okay well let me just

557  
00:27:54,280 --> 00:27:52,320  
describe the Palomas and then I'll turn

558  
00:27:57,380 --> 00:27:54,290  
it over to dr. pol to talk to the

559  
00:28:04,580 --> 00:27:57,390  
nutritional and medical aspects the

560  
00:28:10,360 --> 00:28:04,590  
Palomas once the cave-in occurred it the

561  
00:28:14,300 --> 00:28:10,370  
chileans drilled approximately 15 holes

562  
00:28:15,980 --> 00:28:14,310  
before they were able to find the miners

563  
00:28:17,720 --> 00:28:15,990

in the particular location

564

00:28:23,060 --> 00:28:17,730

they were and then then they were able

565

00:28:26,030 --> 00:28:23,070

to drill three holes near one another

566

00:28:30,820 --> 00:28:26,040

into that chamber those holes are about

567

00:28:34,790 --> 00:28:30,830

six inches in diameter and they're steel

568

00:28:41,350 --> 00:28:34,800

lined they have a casing and through

569

00:28:43,700 --> 00:28:41,360

those holes they pass devices that are

570

00:28:49,400 --> 00:28:43,710

don't hold me to this but roughly about

571

00:28:52,820 --> 00:28:49,410

two meters long that are tubes or

572

00:28:56,090 --> 00:28:52,830

torpedoes that have you know the ends

573

00:28:59,200 --> 00:28:56,100

capped and within that volume they can

574

00:29:03,860 --> 00:28:59,210

insert anything that will fit basically

575

00:29:09,190 --> 00:29:03,870

they then cap those hook a line to it

576  
00:29:13,130 --> 00:29:09,200  
and allow gravity to drop that torpedo

577  
00:29:15,169 --> 00:29:13,140  
down in to where the miners are the

578  
00:29:19,880 --> 00:29:15,179  
miners it takes about ten minutes for

579  
00:29:23,210 --> 00:29:19,890  
that paloma device to reach the miners

580  
00:29:27,049 --> 00:29:23,220  
the miners then have ten minutes to

581  
00:29:29,870 --> 00:29:27,059  
unload whatever has been sent to them

582  
00:29:33,740 --> 00:29:29,880  
and then load anything back in that they

583  
00:29:37,490 --> 00:29:33,750  
want to send topside and then it takes

584  
00:29:39,020 --> 00:29:37,500  
another ten minutes for the paloma to

585  
00:29:43,520 --> 00:29:39,030  
get back up and it's pulled up by a

586  
00:29:46,250 --> 00:29:43,530  
winch and it's a very labor-intensive

587  
00:29:49,700 --> 00:29:46,260  
kind of activity

588  
00:29:52,370 --> 00:29:49,710

you know 30-minute cycle of this you

589

00:29:57,110 --> 00:29:52,380

know the volume is not great so this is

590

00:29:59,810 --> 00:29:57,120

a 24 hour a day operation to provide all

591

00:30:04,000 --> 00:29:59,820

sorts of supplies whether it be food

592

00:30:08,840 --> 00:30:04,010

supplies medical supplies they actually

593

00:30:13,340 --> 00:30:08,850

went out in the open and requested if

594

00:30:17,630 --> 00:30:13,350

there were any any companies in Chile

595

00:30:21,380 --> 00:30:17,640

that made cots for example that would

596

00:30:22,970 --> 00:30:21,390

fit inside these tubes and they could

597

00:30:24,380 --> 00:30:22,980

send them down to the miner so that the

598

00:30:26,030 --> 00:30:24,390

miners wouldn't have to sleep on the

599

00:30:27,789 --> 00:30:26,040

ground they would actually be able to

600

00:30:30,279 --> 00:30:27,799

sleep in what

601  
00:30:32,740 --> 00:30:30,289  
I think most of us would think of

602  
00:30:37,629 --> 00:30:32,750  
as an army type cot that these were

603  
00:30:41,830 --> 00:30:37,639  
aluminum and and canvas kind of devices

604  
00:30:45,070 --> 00:30:41,840  
so very very ingenious way of innovation

605  
00:30:47,560 --> 00:30:45,080  
on their part to you know get some some

606  
00:30:49,659 --> 00:30:47,570  
of the needed supplies so that's how the

607  
00:30:52,450 --> 00:30:49,669  
operation works and let me turn it over

608  
00:30:55,990 --> 00:30:52,460  
to dr. pol to talk to the nutrition and

609  
00:30:58,980 --> 00:30:56,000  
medical aspects in regards to nutrition

610  
00:31:02,169 --> 00:30:58,990  
and medical they did an outstanding job

611  
00:31:05,799 --> 00:31:02,179  
refeeding folks that have been starving

612  
00:31:08,649 --> 00:31:05,809  
is not a simple thing and in fact if

613  
00:31:13,409 --> 00:31:08,659

done incorrectly can be life-threatening

614

00:31:15,720 --> 00:31:13,419

the the minor said reduced themselves

615

00:31:21,940 --> 00:31:15,730

before they were found about a

616

00:31:25,690 --> 00:31:21,950

tablespoon of tuna and an inch and a cup

617

00:31:29,110 --> 00:31:25,700

of milk about every other day so they

618

00:31:32,379 --> 00:31:29,120

were literally less than probably 200

619

00:31:35,019 --> 00:31:32,389

calories every other day at that point

620

00:31:36,909 --> 00:31:35,029

in time it's not as simple as just

621

00:31:40,629 --> 00:31:36,919

giving them carbohydrate and sending as

622

00:31:43,350 --> 00:31:40,639

much food as possible down the hall the

623

00:31:45,759 --> 00:31:43,360

the risk that we have is one in a

624

00:31:49,539 --> 00:31:45,769

precipitous drop of potassium and

625

00:31:53,129 --> 00:31:49,549

phosphate and refeeding them has to be

626  
00:31:55,960 --> 00:31:53,139  
done low and slow and it has to include

627  
00:31:59,080 --> 00:31:55,970  
generous amounts of phosphate potassium

628  
00:32:01,690 --> 00:31:59,090  
and thiamine to prevent cardiac

629  
00:32:06,190 --> 00:32:01,700  
dysrhythmias and even cardiac arrest

630  
00:32:09,310 --> 00:32:06,200  
from cardiac failure they did a textbook

631  
00:32:12,009 --> 00:32:09,320  
refeeding plan they followed with

632  
00:32:15,310 --> 00:32:12,019  
different formulations that included

633  
00:32:17,259 --> 00:32:15,320  
those particular elements and did it in

634  
00:32:19,960 --> 00:32:17,269  
a stepwise fashion to bring the calories

635  
00:32:23,379 --> 00:32:19,970  
up so that the body's metabolism could

636  
00:32:27,759 --> 00:32:23,389  
get used to glycogen stores again and

637  
00:32:30,310 --> 00:32:27,769  
and insulin it was an outstanding plan

638  
00:32:33,639 --> 00:32:30,320

and probably ended up saving several

639

00:32:35,610 --> 00:32:33,649

minors in the interim the other thing

640

00:32:38,350 --> 00:32:35,620

that we worry about certainly is

641

00:32:40,419 --> 00:32:38,360

something called rhabdomyolysis I won't

642

00:32:42,639 --> 00:32:40,429

even begin to spell that for you that

643

00:32:45,039 --> 00:32:42,649

it essentially amounts to muscle

644

00:32:47,320 --> 00:32:45,049

breakdown both because they were

645

00:32:49,299 --> 00:32:47,330

sleeping on the rocks but also because

646

00:32:51,940 --> 00:32:49,309

due to the starvation they were feeding

647

00:32:54,129 --> 00:32:51,950

off of muscle because they had already

648

00:32:57,639 --> 00:32:54,139

gone through their subcutaneous fat as a

649

00:33:00,639 --> 00:32:57,649

energy store your kidneys cannot

650

00:33:03,119 --> 00:33:00,649

tolerate huge proteins from the muscle

651  
00:33:06,070 --> 00:33:03,129  
breakdown and you can get kidney failure

652  
00:33:09,249 --> 00:33:06,080  
they targeted with some laboratory

653  
00:33:12,039 --> 00:33:09,259  
analysis that we had recommended the

654  
00:33:14,680 --> 00:33:12,049  
miners that had high proteins and their

655  
00:33:16,810 --> 00:33:14,690  
urine and increased their fluid intake

656  
00:33:19,570 --> 00:33:16,820  
and probably prevented kidney failure

657  
00:33:22,019 --> 00:33:19,580  
and those miners and about 50% of the

658  
00:33:27,100 --> 00:33:22,029  
miners had shown that protein breakdown

659  
00:33:30,039 --> 00:33:27,110  
because of their care and attention to

660  
00:33:31,629 --> 00:33:30,049  
detail in those medical both the

661  
00:33:35,129 --> 00:33:31,639  
refeeding plan and the treatment plan

662  
00:33:38,470 --> 00:33:35,139  
and the rehydration plan they prevented

663  
00:33:40,570 --> 00:33:38,480

downstream cascades in of organ failure

664

00:33:43,690 --> 00:33:40,580

whether it's kidney failure or or

665

00:33:46,029 --> 00:33:43,700

cardiac failure or otherwise and allowed

666

00:33:49,889 --> 00:33:46,039

us to get to this sustainment phase that

667

00:33:53,560 --> 00:33:49,899

we're in right now just a phenomenal job

668

00:33:55,480 --> 00:33:53,570

and they're they're dealing with medical

669

00:33:58,389 --> 00:33:55,490

issues right now that we see in

670

00:34:00,519 --> 00:33:58,399

long-duration spaceflight certainly

671

00:34:02,560 --> 00:34:00,529

because it's hot it's greater than 90

672

00:34:05,830 --> 00:34:02,570

degrees and it's greater than 90 percent

673

00:34:08,049 --> 00:34:05,840

humidity fungal infections and things of

674

00:34:10,079 --> 00:34:08,059

that nature skin breakdown are things

675

00:34:12,220 --> 00:34:10,089

that they'll be chasing for some time

676

00:34:14,200 --> 00:34:12,230

but we've given them some

677

00:34:15,909 --> 00:34:14,210

recommendations and they've gotten

678

00:34:18,369 --> 00:34:15,919

recommendations elsewhere as well from

679

00:34:25,030 --> 00:34:18,379

different universities to help cope with

680

00:34:27,909 --> 00:34:25,040

those different ailments so could you

681

00:34:29,770 --> 00:34:27,919

describe being at the site of the mine

682

00:34:34,089 --> 00:34:29,780

and and the family interaction with the

683

00:34:43,190 --> 00:34:39,799

the site is about 40 minutes north west

684

00:34:46,430 --> 00:34:43,200

of north-northwest of Copiapo the

685

00:34:49,520 --> 00:34:46,440

closest town we would drive out there

686

00:34:52,909 --> 00:34:49,530

each morning we would go through about

687

00:34:56,210 --> 00:34:52,919

three to four levels of security

688

00:35:00,980 --> 00:34:56,220

checkpoints to finally get inside the

689

00:35:04,190 --> 00:35:00,990

the mine or the mine the mine area it is

690

00:35:06,140 --> 00:35:04,200

really a beehive of activity with you

691

00:35:10,510 --> 00:35:06,150

know all the different engineering

692

00:35:15,140 --> 00:35:10,520

aspects going on the drilling the Paloma

693

00:35:19,940 --> 00:35:15,150

you know supply replenishment meetings

694

00:35:26,210 --> 00:35:19,950

with the physicians and they speak to

695

00:35:29,480 --> 00:35:26,220

the miners you know twice a day and you

696

00:35:31,910 --> 00:35:29,490

know you got to remember that you're in

697

00:35:36,260 --> 00:35:31,920

a very remote mining area it's very

698

00:35:39,980 --> 00:35:36,270

dusty you know there's a lot of heavy

699

00:35:42,470 --> 00:35:39,990

equipment being around you know moving

700

00:35:48,049 --> 00:35:42,480

around there so it's a it's a very

701  
00:35:50,599 --> 00:35:48,059  
dynamic area of course it was sections

702  
00:35:52,970 --> 00:35:50,609  
you know were the command and control of

703  
00:35:56,930 --> 00:35:52,980  
all the activities were that was in the

704  
00:36:01,549 --> 00:35:56,940  
central central portion the next outside

705  
00:36:05,210 --> 00:36:01,559  
ring if you will is where the families

706  
00:36:07,309 --> 00:36:05,220  
were located there is a kind of a tent

707  
00:36:09,799 --> 00:36:07,319  
city set up for the families and if you

708  
00:36:11,870 --> 00:36:09,809  
if you see the some of the pictures that

709  
00:36:15,109 --> 00:36:11,880  
have been taken these are the tents that

710  
00:36:20,180 --> 00:36:15,119  
have that are yellow and red and white

711  
00:36:22,510 --> 00:36:20,190  
and they're all collected together we

712  
00:36:25,430 --> 00:36:22,520  
had the opportunity to meet the families

713  
00:36:28,910 --> 00:36:25,440

one evening as a group and then all had

714

00:36:32,569 --> 00:36:28,920

an opportunity to you know meet the

715

00:36:35,299 --> 00:36:32,579

families a couple of other occasions the

716

00:36:37,329 --> 00:36:35,309

families have also organized themselves

717

00:36:40,059 --> 00:36:37,339

in a sense the

718

00:36:44,259 --> 00:36:40,069

they have a lady that is kind of the

719

00:36:49,589 --> 00:36:44,269

mayor of the group if you will you know

720

00:36:52,079 --> 00:36:49,599

we made some suggestions to our

721

00:36:54,849 --> 00:36:52,089

physician counterparts that they could

722

00:36:58,029 --> 00:36:54,859

utilize this person and helping with

723

00:37:01,209 --> 00:36:58,039

communication but you know in general

724

00:37:03,579 --> 00:37:01,219

the families are you know as you might

725

00:37:08,319 --> 00:37:03,589

imagine very concerned there's a number

726

00:37:11,370 --> 00:37:08,329

of family members at the site and you

727

00:37:14,559 --> 00:37:11,380

know they were wanting to hang on to any

728

00:37:17,469 --> 00:37:14,569

bit of good news that we could provide

729

00:37:21,519 --> 00:37:17,479

where that the the Chilean our Chilean

730

00:37:24,880 --> 00:37:21,529

counterparts could ride we were able to

731

00:37:26,950 --> 00:37:24,890

just make some introductory remarks to

732

00:37:29,859 --> 00:37:26,960

them and I think they were appreciative

733

00:37:32,999 --> 00:37:29,869

of the fact that that we were there I

734

00:37:37,089 --> 00:37:33,009

know they were all looking forward to

735

00:37:41,049 --> 00:37:37,099

having the optical fiber communication

736

00:37:43,150 --> 00:37:41,059

lines set up that's when the families

737

00:37:44,950 --> 00:37:43,160

were then able to start to have some

738

00:37:46,180 --> 00:37:44,960

video conferences with their family

739

00:37:49,690 --> 00:37:46,190

member

740

00:37:56,709 --> 00:37:49,700

both audio and video so I'm sure there

741

00:38:07,950 --> 00:38:00,759

that describes it initially there were

742

00:38:13,269 --> 00:38:11,109

but as as time has gone by and they've

743

00:38:15,609 --> 00:38:13,279

moved into longer duration operations

744

00:38:17,799 --> 00:38:15,619

there the families have devised

745

00:38:20,229 --> 00:38:17,809

strategies to enable themselves to keep

746

00:38:23,019 --> 00:38:20,239

their own homes going back at home and

747

00:38:24,999 --> 00:38:23,029

also to send a more of a representative

748

00:38:27,309 --> 00:38:25,009

family member to the site and so there

749

00:38:30,989 --> 00:38:27,319

now when we left there were about 200

750

00:38:33,099 --> 00:38:30,999

family members in that campsite that

751

00:38:35,440 --> 00:38:33,109

will start with the questions on the

752

00:38:37,839 --> 00:38:35,450

line well I'll call on the reporters in

753

00:38:40,180 --> 00:38:37,849

the order that were phoned in in with

754

00:38:41,650 --> 00:38:40,190

the number that we have please ask one

755

00:38:44,829 --> 00:38:41,660

question and if we have time we'll come

756

00:38:46,690 --> 00:38:44,839

around for follow-ups so first state

757

00:38:48,940 --> 00:38:46,700

your name and affiliation and direct

758

00:38:50,980 --> 00:38:48,950

your question to a briefer if possible

759

00:38:58,450 --> 00:38:50,990

the Christian Science Monitor please oh

760

00:38:59,800 --> 00:38:58,460

thank you what extent are folks you

761

00:39:05,230 --> 00:38:59,810

mentioned this or I think you hinted at

762

00:39:08,109 --> 00:39:05,240

this earlier on but supporting the the

763

00:39:13,000 --> 00:39:08,119

Forman down there as sort of being the

764

00:39:15,310 --> 00:39:13,010

lead of the group is the folks topside

765

00:39:18,069 --> 00:39:15,320

trying to you know essentially support

766

00:39:19,900 --> 00:39:18,079

the kind of command structures the wrong

767

00:39:22,210 --> 00:39:19,910

word but essentially the the the

768

00:39:27,040 --> 00:39:22,220

organizational structure that the folks

769

00:39:29,740 --> 00:39:27,050

have set up underground very supportive

770

00:39:33,280 --> 00:39:29,750

of the structure that was set up

771

00:39:36,819 --> 00:39:33,290

underground when they actually on day 17

772

00:39:37,990 --> 00:39:36,829

when they actually found the miners they

773

00:39:40,859 --> 00:39:38,000

had already established an

774

00:39:44,530 --> 00:39:40,869

infrastructure and so it was a

775

00:39:46,870 --> 00:39:44,540

deliberate decision on the part of

776

00:39:48,640 --> 00:39:46,880

topside to reinforce that structure and

777

00:39:52,450 --> 00:39:48,650

to provide support as best they could to

778

00:39:58,210 --> 00:39:52,460

that leader into his designated others

779

00:40:02,829 --> 00:39:58,220

as well a spiritual leader and a medical

780

00:40:08,380 --> 00:40:02,839

leader and I also just to follow on

781

00:40:11,109 --> 00:40:08,390

their I think that before the miners

782

00:40:12,839 --> 00:40:11,119

were found and they had contact with the

783

00:40:19,150 --> 00:40:12,849

topside world

784

00:40:21,990 --> 00:40:19,160

this particular Foreman of the team was

785

00:40:25,920 --> 00:40:22,000

really shouldering a lot of of the

786

00:40:28,990 --> 00:40:25,930

responsibility and I think once he had

787

00:40:31,720 --> 00:40:29,000

contact with the topside team was able

788

00:40:36,280 --> 00:40:31,730

to help you know think through some of

789

00:40:38,710 --> 00:40:36,290

these challenges that they had that you

790

00:40:41,500 --> 00:40:38,720

know he still feels a certain level of

791

00:40:46,420 --> 00:40:41,510

burden and responsibility but I think

792

00:40:49,720 --> 00:40:46,430

his overall you know mood has improved

793

00:40:51,339 --> 00:40:49,730

since since he's been able to have some

794

00:40:53,829 --> 00:40:51,349

contact and they've you know been able

795

00:40:58,450 --> 00:40:53,839

to delegate some of the responsibilities

796

00:41:04,540 --> 00:41:02,470

just as CBS Interactive this is Deborah

797

00:41:07,300 --> 00:41:04,550

gage thank you I'm wondering how they're

798

00:41:08,980 --> 00:41:07,310

dealing with sanitation and also I mean

799

00:41:10,960 --> 00:41:08,990

are the miners healthy enough all of

800

00:41:15,510 --> 00:41:10,970

them to survive this ordeal do you know

801  
00:41:18,390 --> 00:41:15,520  
like what if someone would die from a

802  
00:41:23,260 --> 00:41:18,400  
you know from a sanitation standpoint

803  
00:41:26,920 --> 00:41:23,270  
the miners had initially set up a some

804  
00:41:30,550 --> 00:41:26,930  
sanitation stations now that they have

805  
00:41:33,010 --> 00:41:30,560  
more topside help and we understand the

806  
00:41:38,440 --> 00:41:33,020  
chileans understand a little bit better

807  
00:41:42,070 --> 00:41:38,450  
the topography that that they're in and

808  
00:41:44,859 --> 00:41:42,080  
you know how many tunnels and how much

809  
00:41:48,280 --> 00:41:44,869  
access to other areas besides just this

810  
00:41:50,290 --> 00:41:48,290  
living chamber they have they've been

811  
00:41:54,520 --> 00:41:50,300  
able to make some suggestions on where

812  
00:41:57,700 --> 00:41:54,530  
to locate like the latrine where to

813  
00:41:59,890 --> 00:41:57,710

locate a shower area where to locate the

814

00:42:02,770 --> 00:41:59,900

sleeping area where to locate the areas

815

00:42:09,010 --> 00:42:02,780

for eating and recreation and those

816

00:42:11,410 --> 00:42:09,020

types of things so you know I think you

817

00:42:14,530 --> 00:42:11,420

know they've been able to to organize

818

00:42:18,880 --> 00:42:14,540

themselves along those lines with with

819

00:42:23,560 --> 00:42:18,890

topside help of course you know the idea

820

00:42:27,960 --> 00:42:23,570

of death of one of the miners is there's

821

00:42:30,760 --> 00:42:27,970

always a possibility we have you know it

822

00:42:33,130 --> 00:42:30,770

brought up that discussion with our

823

00:42:35,829 --> 00:42:33,140

counterparts and you know just wanted to

824

00:42:37,660 --> 00:42:35,839

kind of stimulate some thinking with

825

00:42:41,230 --> 00:42:37,670

regards to you know how that would be

826

00:42:44,740 --> 00:42:41,240

handled I think it's important that you

827

00:42:46,510 --> 00:42:44,750

know our colleagues also have those

828

00:42:48,880 --> 00:42:46,520

kinds of discussions with the family

829

00:42:52,570 --> 00:42:48,890

members to you know make sure that they

830

00:42:54,280 --> 00:42:52,580

understand that you know just like you

831

00:42:56,829 --> 00:42:54,290

know in any hazardous environment

832

00:42:59,829 --> 00:42:56,839

there's always the risk for you know

833

00:43:02,320 --> 00:42:59,839

something untoward to happen with

834

00:43:04,720 --> 00:43:02,330

regards to their overall health that's

835

00:43:09,480 --> 00:43:04,730

certainly been improving as nutrition

836

00:43:13,140 --> 00:43:09,490

has has been supplemented and I'll ask

837

00:43:16,440 --> 00:43:13,150

JD or AI to make any additional comments

838

00:43:18,840 --> 00:43:16,450

there certainly you know the the miners

839

00:43:22,440 --> 00:43:18,850

are not astronauts they worked pretty

840

00:43:24,030 --> 00:43:22,450

selected and screened to the to the

841

00:43:26,070 --> 00:43:24,040

depth and length that you would an

842

00:43:27,810 --> 00:43:26,080

astronaut and some of the folks have

843

00:43:31,109 --> 00:43:27,820

just happened to be there they were on

844

00:43:34,800 --> 00:43:31,119

trucks or or equipment they were not

845

00:43:37,350 --> 00:43:34,810

part of the the mining contingent who

846

00:43:39,420 --> 00:43:37,360

also got trapped in the mine so you have

847

00:43:41,609 --> 00:43:39,430

a potpourri of folks that bring their

848

00:43:43,530 --> 00:43:41,619

own risk to the table with their medical

849

00:43:47,430 --> 00:43:43,540

backgrounds or their their medical

850

00:43:50,040 --> 00:43:47,440

histories but the the medical team on

851  
00:43:53,310 --> 00:43:50,050  
the topside has done an outstanding job

852  
00:43:56,130 --> 00:43:53,320  
and treating those risks trying to make

853  
00:43:58,740 --> 00:43:56,140  
sure that we optimize their health to

854  
00:44:01,650 --> 00:43:58,750  
the best of our ability leading up to

855  
00:44:04,910 --> 00:44:01,660  
the rescue that includes managing things

856  
00:44:08,160 --> 00:44:04,920  
like diabetes hypertension managing

857  
00:44:10,710 --> 00:44:08,170  
pulmonary disease sending medications

858  
00:44:13,020 --> 00:44:10,720  
down and hailers down or other medical

859  
00:44:14,700 --> 00:44:13,030  
care down to make sure that we optimize

860  
00:44:17,340 --> 00:44:14,710  
their health as much as possible and

861  
00:44:20,190 --> 00:44:17,350  
they've done a very good job to try to

862  
00:44:24,660 --> 00:44:20,200  
address those risks and to minimize them

863  
00:44:29,580 --> 00:44:24,670

as much as possible next on the line is

864

00:44:33,030 --> 00:44:29,590

elbow set oh hi I believe my question is

865

00:44:35,250 --> 00:44:33,040

for dr. Horned one of the reasons as you

866

00:44:36,930 --> 00:44:35,260

said earlier on why the miners were able

867

00:44:39,180 --> 00:44:36,940

to remain life for almost two weeks

868

00:44:41,250 --> 00:44:39,190

before being contacted was because they

869

00:44:43,349 --> 00:44:41,260

were well organized but according to our

870

00:44:45,630 --> 00:44:43,359

experience for how long does this people

871

00:44:48,210 --> 00:44:45,640

do people in this conditions can remain

872

00:44:52,280 --> 00:44:48,220

focused and keep organized and not

873

00:44:56,340 --> 00:44:52,290

building all that tension well I think

874

00:45:00,060 --> 00:44:56,350

it's important to realize for all of us

875

00:45:03,150 --> 00:45:00,070

realized that they need to form an

876

00:45:04,620 --> 00:45:03,160

underground community it's going to be a

877

00:45:07,320 --> 00:45:04,630

group of people that live underground

878

00:45:10,200 --> 00:45:07,330

for a long period of time and there will

879

00:45:13,020 --> 00:45:10,210

be roles and responsibilities that are

880

00:45:16,230 --> 00:45:13,030

allocated and just like topside just

881

00:45:20,220 --> 00:45:16,240

like us sometimes if we tire of our role

882

00:45:22,120 --> 00:45:20,230

or we need a change then we're able to

883

00:45:26,220 --> 00:45:22,130

swap with someone else rotate out

884

00:45:29,589 --> 00:45:26,230

and they'll be doing that as well so

885

00:45:31,569 --> 00:45:29,599

organization and focus is a big part of

886

00:45:34,779 --> 00:45:31,579

normality it's a big part of social

887

00:45:37,450 --> 00:45:34,789

structure and community so it's

888

00:45:40,900 --> 00:45:37,460

important that in order to establish and

889

00:45:44,170 --> 00:45:40,910

continue a community that they they have

890

00:45:46,180 --> 00:45:44,180

this this organization and we have to

891

00:45:48,849 --> 00:45:46,190

expect though that they're going to have

892

00:45:50,859 --> 00:45:48,859

their ups and downs just like we do we

893

00:45:51,910 --> 00:45:50,869

have good days we have bad days they're

894

00:45:54,370 --> 00:45:51,920

going to have good days they're gonna

895

00:45:58,390 --> 00:45:54,380

have bad days and the important thing is

896

00:46:02,109 --> 00:45:58,400

that we allow that to happen we not make

897

00:46:05,200 --> 00:46:02,119

too big of a deal about small things and

898

00:46:08,980 --> 00:46:05,210

we support them to return back to a good

899

00:46:09,880 --> 00:46:08,990

day but there will there'll be

900

00:46:14,650 --> 00:46:09,890

challenges ahead

901  
00:46:19,269 --> 00:46:14,660  
they're just now entering a period of

902  
00:46:22,029 --> 00:46:19,279  
the long run and and they're just

903  
00:46:24,970 --> 00:46:22,039  
beginning to confront some of the issues

904  
00:46:28,930 --> 00:46:24,980  
that that they'll have as far as being

905  
00:46:37,299 --> 00:46:28,940  
there for a long duration next on the

906  
00:46:43,930 --> 00:46:37,309  
line is agency friends press sarod Diego

907  
00:46:48,370 --> 00:46:43,940  
on the line for AFP Galveston County

908  
00:46:50,710 --> 00:46:48,380  
County Daily News hi this is Haley kappa

909  
00:46:53,140 --> 00:46:50,720  
so it's a Gallatin County Daily News I

910  
00:46:56,980 --> 00:46:53,150  
guess this question would be for dr.

911  
00:46:58,990 --> 00:46:56,990  
Holland um you're mentioning how I just

912  
00:47:01,269 --> 00:46:59,000  
got specific jobs that aside for

913  
00:47:03,640 --> 00:47:01,279

different minors when they're not

914

00:47:05,620 --> 00:47:03,650

working or reading or doing any of those

915

00:47:07,690 --> 00:47:05,630

functions and what are they doing on

916

00:47:10,359 --> 00:47:07,700

their downtime and what recreation

917

00:47:15,549 --> 00:47:10,369

activities I recommended down there to

918

00:47:17,140 --> 00:47:15,559

keep their morale up well the Chilean's

919

00:47:23,559 --> 00:47:17,150

have done a very good job of sending

920

00:47:25,839 --> 00:47:23,569

down games of sending down activities

921

00:47:29,309 --> 00:47:25,849

that they can do as much as possible

922

00:47:32,609 --> 00:47:29,319

through this very small borehole

923

00:47:35,180 --> 00:47:32,619

resupply system that they have there's

924

00:47:38,579 --> 00:47:35,190

music down there there was a community

925

00:47:42,630 --> 00:47:38,589

iPod and it's brought up periodically

926

00:47:46,650 --> 00:47:42,640

for recharging and so they're able to

927

00:47:50,160 --> 00:47:46,660

have music as well so they've sent down

928

00:47:54,689 --> 00:47:50,170

clothes they've sent down shave razors

929

00:47:57,359 --> 00:47:54,699

and they're trying to support that off

930

00:48:01,259 --> 00:47:57,369

time that leisure time journals to write

931

00:48:03,809 --> 00:48:01,269

in books to read anything that can be

932

00:48:06,680 --> 00:48:03,819

compressed into this this very small

933

00:48:09,239 --> 00:48:06,690

diameter Paloma is what they're doing

934

00:48:14,729 --> 00:48:09,249

but you touched on the most important

935

00:48:16,709 --> 00:48:14,739

thing which is meaningful work it's very

936

00:48:18,930 --> 00:48:16,719

important for people in situations like

937

00:48:23,640 --> 00:48:18,940

this to have meaningful work to do not

938

00:48:25,410 --> 00:48:23,650

make work and these these men are no

939

00:48:28,589 --> 00:48:25,420

different and so part of their

940

00:48:31,079 --> 00:48:28,599

meaningful work is continuing the

941

00:48:33,229 --> 00:48:31,089

responsibility of extracting themselves

942

00:48:36,120 --> 00:48:33,239

from this mind and that includes

943

00:48:38,689 --> 00:48:36,130

maintaining the machinery includes

944

00:48:42,209 --> 00:48:38,699

maintaining the mine itself it includes

945

00:48:46,410 --> 00:48:42,219

continual organization to prepare for

946

00:48:50,339 --> 00:48:46,420

extraction so these are very important

947

00:48:56,120 --> 00:48:50,349

things for them to continue okay next is

948

00:48:59,009 --> 00:48:56,130

Newsweek please thank you I'm wondering

949

00:49:01,709 --> 00:48:59,019

if we could talk more about sort of that

950

00:49:04,289 --> 00:49:01,719

the materials being sent up and down and

951  
00:49:05,640 --> 00:49:04,299  
the specifics of the logistics of that

952  
00:49:08,069 --> 00:49:05,650  
what what kind of things are they

953  
00:49:10,650 --> 00:49:08,079  
sending up besides you know pieces of

954  
00:49:14,459 --> 00:49:10,660  
paper and and notes to their families

955  
00:49:16,920 --> 00:49:14,469  
and how how thick is the Paloma and how

956  
00:49:19,589 --> 00:49:16,930  
much space inside are they actually

957  
00:49:20,910 --> 00:49:19,599  
working with and maybe you can give an

958  
00:49:23,609 --> 00:49:20,920  
example of some of the more difficult

959  
00:49:26,249 --> 00:49:23,619  
things that were you know some of the

960  
00:49:29,910 --> 00:49:26,259  
more creative ways that things were

961  
00:49:38,069 --> 00:49:35,609  
I'm not sure we have all the the the

962  
00:49:40,740 --> 00:49:38,079  
detail on that we can only give you

963  
00:49:44,880 --> 00:49:40,750

approximate sizes of these Palomas we

964

00:49:47,849 --> 00:49:44,890

can find that more detailed Clint Craig

965

00:49:49,710 --> 00:49:47,859

I know you observed a lot of the Paloma

966

00:49:55,200 --> 00:49:49,720

activities perhaps you could make some

967

00:49:57,270 --> 00:49:55,210

comments there yeah I think what you

968

00:50:00,329 --> 00:49:57,280

mentioned she's actually talking about

969

00:50:03,200 --> 00:50:00,339

the side probably about four inches in

970

00:50:06,569 --> 00:50:03,210

diameter approximately two meters long

971

00:50:09,180 --> 00:50:06,579

and they were putting all sorts of stuff

972

00:50:12,990 --> 00:50:09,190

in there the last day we were there I

973

00:50:17,490 --> 00:50:13,000

noted that they've had some meals that

974

00:50:21,809 --> 00:50:17,500

were put in some styrofoam coffee cup

975

00:50:23,609 --> 00:50:21,819

sized containers and and they were

976

00:50:27,079 --> 00:50:23,619

sending those down for each of the

977

00:50:30,799 --> 00:50:27,089

miners they sent down bottled water and

978

00:50:32,789 --> 00:50:30,809

others and sustainment stuff and

979

00:50:35,299 --> 00:50:32,799

additionally one of the engineers told

980

00:50:40,940 --> 00:50:35,309

me they were going to send down a l

981

00:50:43,349 --> 00:50:40,950

don't know what you call it a a

982

00:50:44,910 --> 00:50:43,359

something to watch movies with it's kind

983

00:50:46,710 --> 00:50:44,920

of like a projector where you can buy

984

00:50:48,030 --> 00:50:46,720

these very small projectors these days

985

00:50:50,069 --> 00:50:48,040

that are about the size of a pack of

986

00:50:52,890 --> 00:50:50,079

cigarettes I'm told sorry give me a

987

00:50:55,049 --> 00:50:52,900

while to think of the word but they're

988

00:50:57,569 --> 00:50:55,059

apparently going to be able to watch

989

00:51:03,180 --> 00:50:57,579

movies it was specified times Alka

990

00:51:05,760 --> 00:51:03,190

probably talking more about that but dr.

991

00:51:08,670 --> 00:51:05,770

Duncan had mentioned that they sent down

992

00:51:11,010 --> 00:51:08,680

cots and other things so the Paloma

993

00:51:14,309 --> 00:51:11,020

operations are as you said are going

994

00:51:17,190 --> 00:51:14,319

nonstop 24 hours a day and they're

995

00:51:19,170 --> 00:51:17,200

working well I think it's important to

996

00:51:21,780 --> 00:51:19,180

understand that you know they have 33

997

00:51:25,010 --> 00:51:21,790

miners to feed at least three meals a

998

00:51:28,609 --> 00:51:25,020

day and that takes a fair amount of time

999

00:51:31,859 --> 00:51:28,619

to accomplish other things that they're

1000

00:51:35,190 --> 00:51:31,869

sending down and the miners send back or

1001  
00:51:39,089 --> 00:51:35,200  
things like the headlamps for their

1002  
00:51:41,100 --> 00:51:39,099  
mining caps have the batteries recharged

1003  
00:51:45,090 --> 00:51:41,110  
on those things

1004  
00:51:47,520 --> 00:51:45,100  
and you know just a just a variety of of

1005  
00:51:51,660 --> 00:51:47,530  
things they've also sent clothing down

1006  
00:51:56,040 --> 00:51:51,670  
to them it was actually you know once

1007  
00:51:59,850 --> 00:51:56,050  
they all had an opportunity to bathe and

1008  
00:52:02,430 --> 00:51:59,860  
shave and get an exchange of clothes one

1009  
00:52:04,560 --> 00:52:02,440  
of the miners actually put on a bit of a

1010  
00:52:08,730 --> 00:52:04,570  
floor show showing how they look now

1011  
00:52:12,180 --> 00:52:08,740  
with their blue blue trunks and red

1012  
00:52:15,830 --> 00:52:12,190  
shirts and they were you know having a

1013  
00:52:24,960 --> 00:52:15,840

good time with that with that activity

1014

00:52:34,350 --> 00:52:24,970

hey next is CBS London so a gym on from

1015

00:52:42,150 --> 00:52:40,010

and Amy from channel 4 okay with that

1016

00:52:44,730 --> 00:52:42,160

those are all the questions that we had

1017

00:52:47,220 --> 00:52:44,740

on the line to start out with we'll have

1018

00:52:49,290 --> 00:52:47,230

to wrap it up here and for more

1019

00:52:51,660 --> 00:52:49,300

information on this subject and other