

NIOSH/NPPTL Public Meeting to Discuss the Approval of
Respiratory Devices Used to Protect Workers in
Hazardous Environments

SCSR CONCEPTS

April 10, 2003 - 8:00-11:30 a.m.
Marriott Key Bridge Hotel - Arlington, Virginia

TRANSCRIPT LEGEND

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P R O C E E D I N G S

1
2 **TIMOTHY REHAK:** Welcome and thank you for attending our
3 public meeting to discuss our SCSR concepts for a standard
4 which we intend to use in a proposed rule later this year.
5 This morning, we will present our concepts and other
6 approaches for improving the performance, reliability, and
7 quality of SCSR protection. The National Institute for
8 Occupational Safety and Health, in consultation with the Mine
9 Safety and Health, is in the process of developing a proposed
10 rule on the performance and reliability requirements of close-
11 circuit self-contained escape breathing apparatus. My name is
12 Tim Rehak and I work as an engineer for the National Personnel
13 Protective Technology Lab in Pittsburgh.

14 Here is the agenda which we will strictly adhere to.
15 Following my introduction and some administrative items, we
16 will have Bob Stein with NIOSH provide an Analysis of SCSR
17 Problems. Next we will have Jeff Kravitz with MSHA review the
18 Long-Term Field Evaluation. Following a break, John Kovac
19 will review our proposed concepts for the new standard. Each
20 presentation will last approximately 15 to 20 minutes, so
21 there will be 10 minutes available for questions and comments.
22 Ah and also we have a lot of time at the end of the program
23 for questions and if anyone else wants to make comments.
24 Okay, again, my name is Tim Rehak. If you would like to make

25 and have any one-on-one meetings with us which we encourage
26 and welcome, please contact me. My number is there. My e-
27 mail address is there. All the information is in a packet of
28 material that you received.

29 The purpose of this public meeting is to present concepts
30 for close-circuit self-contained escape breathing apparatus.
31 Our concepts will deal with implementing breathing and
32 metabolic simulator testing, ruggedness and reliability
33 requirements, along with safety requirements. We will also be
34 adding standards for eye protection, implementing audits, and
35 looking at having registration for SCSR's. These standards
36 are being developed by NIOSH in consultation with MSHA.

37 Some logistics for the meeting - we have sign-on sheets
38 outside. Hopefully, everyone signed in. If you want to get a
39 copy of the attendees, we'll have them ready for you after the
40 public meeting this morning. I'd like to let everyone know
41 that these meetings are being recorded and they will be
42 transcribed and made part of the docket for this.

43 Presentations will be made in accordance with the agenda.
44 We're strictly going to adhere to the agenda because we have
45 another public meeting that starts on multi-functional PAPR's
46 which will start at 12:30 p.m. So we have to keep to our time
47 schedule. Anyone who wishes to make comments, we have a
48 microphone here. We'd like you to come up and say who you

49 are, what organization you represent, and it will be part of
50 the transcription.

51 Okay, further like I say all comments from this meeting
52 will be transcribed and made part of the docket. If anyone
53 wishes to get the transcription, they can contact our docket
54 office, included we have the mail, e-mail address, fax, and
55 phone number, but what I want to point out here is you need to
56 reference docket number NIOSH-05, anything pertaining to this
57 subject.

58 Question: (inaudible)

59 Response: No, that's a different one.

60 A little bit on the timeline - we're having the meeting
61 today in Arlington. We also have a public meeting April 24th
62 in Denver, Colorado, at the Colorado School of Mines. We'd
63 like any comments that you would have or want added to the
64 docket received by June 1st and also want to notify you that we
65 propose to have a notice of proposed rule making by the end of
66 September of this year. If there's no questions, we'll move
67 to Mr. Robert Stein --.

68 **ROBERT STEIN:** Notice the interpretation is strictly
69 adhering to the schedule means as early as or earlier. That's
70 strict. If we're going to develop a new regulation, it would
71 be a good idea that we know why we're making the changes that
72 we're making. There's been a standard for self-contained

73 breathing apparatuses existed in the regulation when it was in
74 30 CFR under Part 11 and that same technical standard, of
75 course, was brought along when it was moved from there into
76 42 CFR, Part 84 without really any change in the technical
77 requirements. And that standard has served rather well but,
78 of course, I think most of us in the room here are aware that
79 there are things that we would like to improve certainly in
80 regard to the standard to address some of the issues that
81 we've seen in the field over the years. This type of
82 equipment as far as a self-contained emergency escape
83 apparatus was introduced into mines in 1981. So we now have
84 the benefit of over 20 years of experience with them in the
85 field and we want to make sure that we've used the lessons
86 learned as we move forward. None of us like to think about a
87 scene like this and I'm understanding this morning that the
88 potential for something like this is once again looming over
89 us and our thoughts, our hopes, of course, would be that if we
90 did see a scene like that that everything going on underground
91 would be quite orderly is what we would be able to find are
92 people who have their emergency escape equipment with them are
93 able to don it and able to proceed in an orderly manner to
94 exit out of the mine. This is, of course, the most broad use
95 of this equipment historically. There are some of these
96 devices installed in other locations and for other purposes,

97 but by in large we know that most of them are used in
98 underground coal mines.

99 We stepped back and we looked at what's been going on
100 with these units and picked a time period since 1992. We had
101 good information on these incidents and a good basis for
102 analysis to look at what's the cause of all the issues that
103 have arisen. We analyzed it. We counted up. This represents
104 a total of 66 incidents. Some of the incidents involved many
105 units. Some of the incidents may have only involved one unit.
106 So it's hard to -- Don't try to read into that anything more
107 about what numbers are involved except that there are
108 66 incidents and we wanted to break that down and see
109 according to you know causes that affect these units. What do
110 we have and it breaks down to approximately in this way.
111 We've analyzed it individually and together. The numbers come
112 out one or two different occasionally, but for the most part,
113 they always come out looking something like this. An
114 approximately equal proportions being due to something that we
115 would call quality control, that is, there was an issue with a
116 unit when it was built or sent into the field and about an
117 equal proportion in reliability. Something has happened to
118 the unit as a result of something it's experienced while it's
119 in the field. And that green wedge down there, things that we
120 categorized, most of those were training related. How do we

121 either use a unit or how do we inspect the unit. How do we
122 take care of it or something is involved with that or that
123 catch all that we have, the other, the ones that we can't
124 quite categorize because they're too unique, too individual.
125 We want to use this as the basis for how we are making our
126 improvements and our long-term objective is, of course, to
127 identify some type of strategy that will take all of this into
128 account and not over complicate things. We want improvements
129 in the performance and reliability and we felt that we could
130 achieve this at that time through either policy changes and/or
131 role making which, of course, is why we're here today.

132 A little bit later on, Mr. Kravitz will be making a
133 presentation. Some of the things that have been done through
134 policy, he'll be talking about in the long term, field
135 evaluation. The number of units sampled from the field was
136 stepped up, increased so we'd have a better handle on what was
137 going on with the units in the field. Our philosophy, we want
138 to be able to approve the simplest kind of design that meets
139 whatever performance standard is appropriate. It has, of
140 course, that scientific validity. We wanted also to result in
141 ease and confidence in use. So, you know, too many bells and
142 whistles perhaps it's too complicated to easily don the unit,
143 activate the unit, wear the unit, whatever. We want it to be
144 simple. And, of course, that lends to greater reliability.

145 We feel that the simpler design the more reliable the unit,
146 the fewer parts, the fewer systems you have to rely on.
147 Obviously, the reliability of the individual systems becomes
148 less of an issue that way for overall system reliability and
149 that extends beyond the unit even into. How am I going to use
150 the unit? If I have a problem, an emergency, if it's
151 complicated to use that's part of that system of reliability
152 we're speaking about, not just the unit itself. The entire
153 process from the time it gets into the hands of the user till
154 the time that the user may have to activate it and use it to
155 make an exit from some confined space, some place where the
156 atmosphere may be toxic or oxygen deficient.

157 We also, of course, want to make sure that whatever we do
158 that we don't suspect that we'll be perfect and that if that
159 there are problems, we want to discover them early and have
160 whatever reaction comes up as a result of that be effective
161 and very isolated so it's limited to just those units that
162 might have an issue with them. You don't want to have to have
163 scatter gun solutions that effect units that really don't have
164 a problem. Sometimes the way the system works now we have no
165 other choice except to apply perhaps a fix to a big broader
166 population of units than what we want to. So we want to make
167 sure that any intervention is truly effective and we want to

168 be able to take into account obviously the weakest link, the
169 human error, by building in redundancy to this system.

170 We call this shared responsibility and in terms of role
171 making this is talking about a new quality assurance module to
172 help effect a positive change in some of those areas that
173 obviously has the most impact on the manufacturing process.
174 We, of course, what we're here to talk about today is the
175 technical module for the performance of the unit. What's the
176 unit suppose to look like, what features is it suppose to
177 have, how's it suppose to perform, and Mr. Rehak referred to
178 some of these a little bit earlier. We feel we need to have
179 some kind of ruggedness and hazards evaluation. This has been
180 done historically as an after the approval had been issued.
181 Units had been tested for these aspects/attributes, but not
182 necessarily as part of the approval and in many areas that
183 we're looking at today we see this as a necessity. You're
184 going to put units out in the field you want to have some idea
185 that there's a certain amount of ruggedness built into it and
186 they don't introduce any new hazards into the areas into which
187 they are going.

188 Part of the solution in breathing metabolic simulator
189 testing, we talked about this for quite some time now and we
190 are confident that this is something that needs to be done,
191 needs to be added as a more independent objective bench mark

192 for performance evaluation. We have that much more experience
193 with using it. We have that much more experience with knowing
194 what kinds of tests would be appropriate. We want to make
195 sure that training is improved both in terms of users knowing
196 what to look for, how to know whether the unit is ready to
197 use, when it's not ready to use, and obviously something that
198 we've also desired for some time, expectations. When I do
199 have to use this unit, what am I going to experience? Another
200 new aspect that we're looking for is we want the units to be
201 able to report on their own condition. If there's a problem,
202 obviously nothing can be built to where you can't destroy it.
203 Anything can be destroyed. The big problem is knowing when
204 that unit has been compromised. We feel it would be better if
205 you could effectively inspect it. Know when the unit has
206 experienced a problem and be able to remove that unit from
207 service. The idea is to make it so that every unit that's
208 ever put into service is going to survive for some fixed time
209 period and be available for a person to use. What we want is
210 a system where every unit that's put out there can be
211 effectively inspected, the user can look at it before it's,
212 daily inspection, whatever the time period be, know and assure
213 themselves that yes, indeed, if I have an emergency, this
214 one's ready to go. If anything happens to compromise that
215 unit in the time period in which it's been deployed, we want

216 to user to be able to tell very readily, oh, there's a problem
217 with this. I'm going to take it out of service and get
218 another one. Part of this could be non-destructive testing.
219 Perhaps visual inspections won't get it for the whole, every
220 performance aspect or every material aspect of the unit. So
221 if it has to include non-destructive testing, so be it. We
222 want those to be simple to run and it's obviously something
223 you can use in the field.

224 There's going to be an expanded role for the long-term
225 field evaluation. This is something we obviously have done in
226 partnership with MSHA over the years giving us the support in
227 the field, being able to collect units, help us characterize
228 what is out there because we try to proportion it to what the
229 distribution of the units is and we want to know the different
230 conditions that are coming from. MSHA has always been our
231 partner in providing that information and access to the units.
232 Registration is a new concept. We talked a little bit earlier
233 about having any time there's an effort to mediate a problem
234 or issue that comes up, one of the first questions is how many
235 and where are they? Typically, we don't know. And this
236 registration is something that we want to approach to see if
237 we can't answer those questions very rapidly any time an issue
238 occurs.

239 Graphically it lays out a little bit like this. The
240 umbrella covers the whole spectrum and we have the things on
241 to the left. I'm glad I looked at the screen. The colors
242 look a little different to you than they do to me. The block
243 to the left, the simple design, those come in ahead of time in
244 terms of how the unit is built, quality controls that are
245 applied to it. The things that have to occur during the
246 approval any ruggedness or hazards testing, any simulator
247 testing is also added to that. And the yellowish or goldish
248 looking block are things that occur and have to occur when the
249 unit is deployed, training, how the units are handled, how
250 they're inspected, any audits that are done once any post-
251 deployment audits that are done. This is where self-reporting
252 features come into play. This is where non-destructive
253 testing comes into play. It's also the role of the long-term
254 field evaluation to evaluate the units in spite of what we,
255 get the ones that we think look okay. We run them on the
256 simulator to make sure that indeed they provide the
257 performance that we would inspect. And finally, registration
258 and you can see we got that under effective reaction. Where
259 are the units? How many of them are out there? Who has them?
260 Can I locate them?

261 Our breakdown of problems and this is rather dense with
262 information. You have copies in your handouts. Don't try to

263 read the individual lines. The incidents that I talked about
264 earlier what I want to point out here. This is the portion of
265 those 66 incidents that we attributed to quality issues.
266 Okay, when you look at the nature of what came up, these
267 things were attributable to something that was in the unit or
268 it was there before it went into the field effectively as far
269 as we can determine. So what we want to see though is our new
270 umbrella over there to the right where we have shared
271 responsibility. Each column represents will this be a catch?
272 Is there something in the new standard that we envision that
273 would catch us, issue, you know, prevent it from being an
274 issue for somebody who needed to wear the unit in an escape.
275 And an X represents what we would call a catch. This is some
276 filter that should knock out those issues or should have
277 knocked them out and what I want to point out to you is the
278 redundancy aspect is that no row has less than two X's in it.
279 So we feel that there will be several layers in which to catch
280 these issues and we wanted to just analyze the things that did
281 occur to see whether we would have effective solutions. Of
282 course, we would expect that we would see the same kinds of
283 things in the future and so how can we build filters to knock
284 those out. And in the two or actually three columns they're
285 the most solid obviously if it's an issue with how the unit
286 was manufactured that the QC module would have some effect on

287 most of those. Also registration, if there's an issue, if we
288 identified it to a small portion of units, where are those
289 units? Can we go out and grab them out of service very
290 rapidly and replace them if we know it's just a small number
291 and we know where they are. Yes, you can get those particular
292 ones. Replace them. Far less of an issue than if they're
293 scattered in with a much larger population, it has to be
294 collected and you have to collect the good along with the ones
295 that are suspect. Long-term field evaluation has a lot of X's
296 in it because again this is the means for discovery. Many
297 times when the long-term field evaluation is being run at a
298 level similar to what it is now, it's able to identify some of
299 these issues very early on. The reliability portion, things
300 that happen to the unit once it's in the field. In other
301 words, when we analyze the issues, looked at it, it looked
302 like what had arisen that was a problem in these particular
303 units was there because of something that happened to it once
304 it was deployed in the field or once a group of units was
305 deployed in the field. Again, some of these could have
306 effected one unit, some of them could have effected very many.
307 So what kinds of things do we feel would affect this?
308 Obviously, ruggedness testing may affect this. It could build
309 in a higher level of ruggedness upfront. Again, we don't
310 expect that we're going to make all of them absolutely bullet

311 proof. That's not the philosophy. We want to improve the
312 ruggedness and assure that there's a consistent level across
313 all units. So we feel that that again would be a big catch on
314 this.

315 Training and proper handling comes out high on this list.
316 If you have a very effective system, but it relies on the user
317 knowing how to handle and examine the unit, if that training
318 hasn't been given, that part of the system breaks down. So
319 that's an important aspect of this. Self-reporting non-
320 destructive testing, again, if something occurs to the unit in
321 the field, if the unit is able to tattle on itself, high heat
322 is the problem, if the unit can show that it has been in a
323 high heat environment and reveal that it's been exposed to
324 environmental conditions that it shouldn't have been, that's a
325 good catch. You pull that out of service. Long-term field
326 evaluation, again, it's kind of like the last line of defense.
327 First line of defense however you look at that. Registration,
328 again, if we know in particular what's been affected, we know
329 where those units are, we can go out and run our remediation
330 and target it very specifically to units that might have that
331 issue. And, finally, the catch-all category, the training or
332 the other, this is probably the largest proportion of the
333 single units. Things like a unit being run over and possibly
334 causing an ignition. We do have those reported to us.

335 Obviously that's not within the scope of normal use. One
336 thing that we do know is that as far as any that have ever
337 been reported to us that it never got out of control. It may
338 have started a small fire, one that could easily be
339 extinguished. We don't know of any of those having caused a
340 huge problem. Startling I'm sure, but not unmanageable and
341 one that is good for people to know you have to be careful on
342 how you handle these or where you put them. You don't want to
343 let them fall into a location where they could be abused.
344 Again, we feel like this is their multiple levels on which
345 these kinds of issues might be caught.

346 What do we want to end up with? On a concept level, we
347 want to end up with a standard that allows for usefulness,
348 usability. Answer these questions for the user. Is my SCSR
349 reliable? In our experience, people with hands-on in the
350 field don't like a statistical measure of how much they might
351 be able to rely on that unit. They'd like to be able to
352 assure themselves rather than just say well 90% of these are
353 good. To look at it and say I know from what I've been
354 trained and been told and I can inspect this thing well
355 enough, I know this one is good to go. If I have a problem, I
356 can open it up and use it. That's the kind of goal that we're
357 shooting for. So will it work for me? Will it save my life?
358 If I've been trained, I know how to use it. I know where to

359 go in the event of an emergency. I have much more confidence
360 that this unit is going to do something good for me. It's not
361 just a brick that I've been carrying around with me for the
362 last 3 years. It's actually something that can do me good in
363 an emergency.

364 The accountability portion, we want to try and address
365 this. Who is responsible for safe-keeping? What does safe-
366 keeping mean? We feel that there is sometimes some confusion
367 about these issues. You know do the units, are they suppose
368 to be bullet proof or they're not. We want to be clear on
369 that. We want the standard to be very clear, not bullet
370 proof, but if the units happen to be defective in some way
371 that's going to compromise their performance, we want that to
372 be evident and that's part of what safe-keeping means. So at
373 this point, I'll stop. That's the last slide of my
374 presentation. I'll ask if there are any questions.

375 One thing I might add while you're thinking, we've been
376 looking at this for quite some time. You know the evidence in
377 the slides that it has been very environment specific.
378 Obviously, these units could have a much broader application
379 in these times. One of the big issues we've been looking at,
380 of course, is anti-terrorists types of respiratory protection.
381 These units having the capability of being able to protect you
382 against any level of contaminant, at least your respiratory

383 system. It doesn't obviously provide any protection from
384 skin-borne threats or things that would enter your body that
385 way, but as far as the level of contamination with them being
386 a closed and self-contained system, they provide a very high
387 level of protection. So would it be a good type of apparatus
388 to use, perhaps. To answer those questions in terms of
389 anything that we have done in the current standard in terms of
390 technical improvements, so far has not addressed will it
391 protect against those agents, but those types of things could
392 be added. It's something obviously that's been thought of.
393 We have people here that could address that if we get specific
394 questions about that. I just wanted to mention that though
395 that those aspects will not hold up our development of this
396 portion of the standard. We intend to move forward with it if
397 there are additional tests and so forth. Those could be added
398 where you could have units that have two levels of protection:
399 one at a general level of protection and perhaps, if needed,
400 one to protect against these types of higher level threats.
401 Questions? None? That must have been perfectly clear then.

402 **BOB (INAUDIBLE)** with (inaudible) Safety, couple of
403 questions. I don't know if you can address this one or not,
404 but on the QC module, when is that coming out?

405 **ROBERT STEIN:** I think that the schedule right now is to
406 have a draft by the end of September.

407 **(UNIDENTIFIED SPEAKER):** There will be a proposed rule
408 announced at the Federal Register in October.

409 **ROBERT STEIN:** I was close.

410 **(UNIDENTIFIED SPEAKER):** Yeah not a bad guess Bob. Under
411 registration, as part of the manufacturer, we do serialize the
412 product. We record that information as it comes in the door.
413 We record it out as to who we send the product to. Now we
414 have reliable distributors, but on the other hand, some
415 distributors may not record information. So that becomes a
416 registration issue and that's where you essentially put out a
417 notice to the whole community. Correct?

418 **ROBERT STEIN:** Yes, I mean, that registration, I mean,
419 it's the way you're describing it, it's like trying to push a
420 string. Obviously you can't do that. It needs to come from
421 the user end. So part of that shared responsibility has to be
422 well, you know, I'm going to identify the pool of units I have
423 because after all who is the most reliable source to know
424 where they are is the user. And we realize that not only do
425 you have the issues that you described because the channels of
426 distribution aren't always as tight as though you described.
427 That's not anything that's specified in a regulation. It's
428 not anything that we would choose to say this is how you have
429 to distribute it, but rather just make it very simple and say
430 once they're in the hands of whoever is going to use that if

431 that's the information we need regardless of how they got it
432 and it kind of addresses that secondary market issue too.
433 Because obviously regardless of how well your system works,
434 once it gets into the hands of user A, if user A decides I
435 don't need it anymore and I'm going to sell it to user B and
436 how are you going to track that. We can't conceive of anyway
437 that that can happen and we're not sure that, there's a couple
438 of ways you can address that. You can say no secondary
439 market, but that's very difficult to enforce. So you know
440 it's best to know who has them, where they are, and where
441 they're being employed. That's the kind of information we
442 feel would be most useful whenever anything comes up. Where
443 are those units? If we had that information from the owners
444 of them, would obviously be the most targeted way to get it.

445 **(UNIDENTIFIED SPEAKER):** And the final question is. Are
446 you seeing from your end users, not your end users, but people
447 who you are working with a need for a CBRN type of unit?

448 **ROBERT STEIN:** It's just there. I know there are people
449 here that are probably here primarily for this afternoon's
450 presentation. That is such an all-encompassing issue and you
451 know as far as these units go, they're already the right kind
452 of technology. For the most part it would just be a matter of
453 making sure that the materials were correct for chemical,
454 biological, radiological, and nuclear types of agents that you

455 would protect against. So that what we've been thinking about
456 is kind of like again a layer type of thing. Perhaps what, it
457 might be best, depending on what it cost to put it in there,
458 okay. It might be best to allow for two levels of protection.
459 A closed-circuit escape unit that is not CBRN hardened and a
460 closed-circuit escape unit that is CBRN hardened. Okay, we
461 have that in the open-circuit units right now.

462 Other questions? Okay. Mr. Kravitz from MSHA will speak
463 to you about the long-term field evaluation.

464 **JEFFERY KRAVITZ:** Okay, thanks Bob, good morning
465 everyone. My topic this morning is the long-term field
466 evaluation project. There's several approved SCSR's in the
467 1-hour category from the left to the right. We have the
468 Ocenco, Draeger, MSA, and CSE units. We also have a 10-minute
469 Ocenco unit that's on the market currently. Basically, two
470 types of ways to store oxygen. One is through the chemical
471 methods of oxygen production and the other one is compressed
472 oxygen. The long-term field evaluation project is a joint
473 MSHA/NIOSH project. The objective is to track reliability and
474 field-deployed SCSR's. This was initiated back in the early
475 1980's, back then quite frankly, we didn't know how SCSR's
476 would hold up in the mines and I think many manufacturers also
477 didn't know how these units would hold up in this new type of
478 environment. The project, over the course of its 20 plus

479 years now has proven to be very valuable in identifying
480 problems with SCSRs that we have caught before. It caused
481 major problems in the mining industry. So it's been a very
482 successful program and we want to expand this program to make
483 this even more reliable in the future and we're actually in
484 the process of doing that right now. The methodology of the
485 SCSR for this program is basically to sample SCSRs from the
486 mines in the field. MSHA inspectors, along with NIOSH
487 personnel go to various mines that are identified. We work
488 along with the mining company to extract dead SCSRs. We take
489 those SCSRs and replace them with brand new SCSRs and then
490 bring them back to the laboratory where they are tested in
491 those types of conditions. Once they are tested they are
492 compared with the performance of the new SCSRs.

493 When the question of reliability comes up, the first
494 question is. Will my SCSR work when we need it? Obviously
495 the first question is, is there quality control at the point
496 of manufacture? And through the approval process is there a
497 requirement in the approval process for every SCSR
498 manufacturer to have a quality assurance program within their
499 manufacturing plant? We have seen very good quality control
500 programs and also the SCSR manufacturers each year MSHA/NIOSH
501 audit every one of the SCSRs manufacturers. It's a
502 requirement that we've been doing for the last 4 or 5 years

503 now and I think it's been a very valuable program. It also
504 gives us an opportunity to talk with the manufacturers, to
505 understand what their problems might be, and to work out
506 mutual types of solutions to various problems as they arise.
507 Basically other types of reliability issues is how well has it
508 been handled. As miners have to go through this very rugged
509 type of environment daily, sometimes we found that SCSRs
510 aren't handled the way we would expect them to be handled and
511 the way some manufacturers don't want to see them handled.
512 They are beat up sometimes, sometimes they're actually put in
513 circumstances beyond their inspection criteria and those are
514 the reliability types of issues that have to be addressed.
515 Basically, how old the SCSR is also affects how reliable that
516 SCSR may be. Some units that might be out in the field are 10
517 years old, we see coming back that look brand new. Some of
518 them that are 6 months old look like they've been in the mines
519 for 10 years. There has to be a way to determine whether or
520 not they will be reliable when needed.

521 When should an SCSR be removed from service? Our
522 inspection criteria, again, is part of the approval process
523 from the documentation that is required for the approvals that
524 manufacturers have to submit inspection criteria and those
525 criteria are well documented and hopefully well instituted in
526 the mines and most of the time they are depending on how well

527 the miners are trained. The training programs that we've seen
528 out in the field can range from an SCSR safety specialists
529 showing a video and saying that's it guys to hands-on which is
530 now required in the mining companies and some of these
531 programs vary all over the spectrum. I've seen extremely
532 well-produced training programs and then on the other hand
533 we've seen programs that are minimal. Will the evacuation
534 under oxygen be successful? Again, how well are the miners
535 trained? How well do they know their escape routes? All that
536 goes into the emergency plans at the various mines. Also, do
537 they have confidence in those units? One thing we've seen
538 through interviews from miners at mine fires and explosions,
539 is that some miners will take the SCSR mouthpieces out of
540 their mouths even though they're in a toxic environment, start
541 talking to people, and that goes back to the training issue.
542 If you're in a toxic environment, obviously you shouldn't take
543 that out, but it somehow gets into the mindset that talking is
544 more important than keeping that thing in your mouth so that
545 is something that has to be addressed through the training
546 issues and most training programs will address those types of
547 issues. Again, as we discover problems and we make these
548 problems public, a lot of the confidence in the reliability
549 issues with respect to SCSRs have decreased over the years.
550 It's our job to increase the confidence in the SCSR and that's

551 basically through showing that there's more reliability and
552 also respect to the manufacturers for them to also emphasize
553 that these units are very reliable and will work when needed.

554 Again, with respect to reliability issues, in the past
555 we've had problems that were missed in the program to cause
556 too few units were collected. When using a minimal type of
557 budget which limited the amount of units we could collect per
558 year, only up to 50. Last few years we have expanded that to
559 200. I think that's been a major improvement with respect to
560 identification types of issues. Also included are filter
561 self-rescuers into this type of program. Previously we didn't
562 look at the filter self-rescuers and I guess along the years
563 we have recognized that sometimes there may be problems with
564 filters but filters, as a rule, have been extremely reliable.
565 Sometimes the older types of filter self-rescuers have been
566 shown to have dusting problems things like that, that weren't
567 quite identified. Sometimes the results of the long-term
568 field evaluation, when we do find problems, are hard to
569 interpret. With respect to, for instance, a hose problem, if
570 we isolate a problem due to a hose that might be deteriorated.
571 Was that problem due to a heating of the unit? Was it due to
572 a rubber problem? It gets into a gray area where even the
573 rubber manufacturing companies have a very tough time
574 identifying how those hoses were deteriorated. That's

575 something that we're trying to work through also, trying to
576 have a better interpretation of the findings of the program,
577 learning how to compare the breathing metabolic simulator
578 results to Man Test #4. Again Max has been working for the
579 last few years now because Man Test #4 is basically how the
580 units are approved. That's how the time is set for how long
581 that SCSR will be approved for, and there is a regimen in Man
582 Test #4 that these are approved to using human subjects. When
583 you get to the metabolic simulator you're taking a machine,
584 trying to program that machine to actually replicate the
585 performance of humans on a treadmill going through this Man
586 Test #4 regimen and it's very difficult to accomplish. I
587 think NIOSH is getting very close to having that type of
588 program developed now. So there's been some major
589 improvements over the last few years and led part of that
590 program.

591 As far as the in-mine collection, it's based on the
592 amount of market share that the various manufacturers had.
593 You can see on the diagram here that CSE has about 48%
594 followed by Ocenco, MSA, and Draeger about 5% of the U.S.
595 market, and the M20s have about 2%. In 2001 we had about
596 262 units that were included in the program. Remember I said
597 we had the objective to collect 200. If we have a problem,
598 those units are also included when we start testing them into

599 the program too, so that's why that number might be a little
600 bit higher in this particular instance. As a result as it is
601 right now in the 2002-2003 program, there's been about
602 300 units collected so far.

603 As far as the long-term fuel evaluation testing, here is
604 a picture of the breathing metabolic simulator. The majority
605 of the units are tested on this machine. And also MSHA
606 supplies human subjects for the testing using live subjects on
607 a treadmill with people from our mine emergency unit. I'm the
608 head of the mine emergency unit and I can delegate persons to
609 that program when required. With respect to the FSR field
610 evaluation, basically that's something we've been doing over
611 the last couple years. NIOSH purchased the equipment and
612 that's been included in the program also.

613 Again, when should an SCSR be removed from service?
614 Various issues, poor decision making, a lot of times there is
615 imperfect information. Sometimes some of the trainers don't
616 get the information correctly. That's something we're trying
617 to correct right now. A lot of inattention to the units,
618 after a hard day's work, the SCSR might be thrown in a corner
619 with the miner's belt. Obviously it's taking some shock and
620 vibration. If you do that regularly, then you're going to see
621 some internal damage that may or may not show up on the
622 external features of the SCSR. In the past there's been no

623 unanimity of judgment and action. Some people are wishy-washy
624 about well maybe that's good for you maybe it's not. We don't
625 want that in the mines. We want to make sure that when that
626 SCSR is needed, it will work properly for that miner because
627 that's going to be the life line between life and death
628 issues, escape and non-escape. Sometimes there's confusion
629 about who is accountable for safe-keeping as well as what
630 safe-keeping really means. Solutions to that would be some of
631 the new QC standards that we're going to be discussing today:
632 a new type of training package that we're in the process of
633 developing right now and making the units easier to inspect.
634 One way would be through pass/fail types of indicators,
635 temperatures, shock, vibration, other types of indicators as
636 Bob was saying. You look at your SCSR and then the SCSR tells
637 you when there's a problem instead of someone having to shake
638 the unit or to do some other types of manual testing that
639 requires a higher level of training. We want to make this as
640 simple as possible and for someone who is a novice in the use
641 of the SCSR would be able to pick the SCSR, look at it, and
642 say yes, that's a good SCSR.

643 Basically the decision-making matrix, you have units
644 that, of course, pass the inspections as-approved. This is
645 the area that we're really focusing on the out-of-compliance
646 SCSRs that are kept in service. Some might pass the visual

647 inspection, but you might have internal damage and it's not
648 detectable during the physical examination of the unit.
649 Obviously if the unit fails the physical examination, it's
650 been removed from service. Sometimes units are removed from
651 service as-approved and returned back to the manufacturer and
652 the manufacturer looks at it and says oh, that's fine, it just
653 might have a few cracks here, but it's not affecting
654 performance. They're sent back to the mines, but that's
655 erroring on the side of safety and that's where we want to be.
656 We want to error on the side of safety. Keeping the SCSRs in
657 service when they're actually out of compliance is the area
658 that we're all interested in focusing on.

659 Some examples of SCSRs that might be questionable are a
660 miner might have this on their belt, because there are some
661 cracks here, and they might say well it's just on the outer
662 shell here, it really doesn't look like the internals might be
663 damaged on a cursory examination. But when you take the unit
664 apart you see water, mine dust has gotten into the unit, and
665 that unit probably wouldn't function properly when that unit
666 is actually used for an escape. We want to avoid those types
667 of conditions. We want to make those inspections easier to
668 make and make those inspections very valid.

669 With respect to OXY K-Plus, you see here is a dent in one
670 of the older style holders. These cases are extremely rugged

671 and the outside you see well that might be the only type of
672 damage, but then when you start to look at it this particular
673 unit had a crack in the plenum and it wasn't actually detected
674 until someone tried to activate the unit. Luckily that was a
675 training situation, although that situation existed, actually
676 didn't affect anyone, but again, it was an inspection issue.
677 The manufacturers have very good inspection criteria, but it's
678 how they're interpreted at the mines. And something like a
679 dented holding strap here or a belt strap may look something
680 like minimal, but it might be an indicator that the unit has
681 taken a substantial shock and that's transmitted to internal
682 components.

683 Again, with respect to the Ocenco unit, it's a very hard
684 shell. It's a shell that you can see through and it's a very
685 rugged unit. Again, you got to look hard sometimes to see
686 where the little cracks might be which might indicate that
687 there is some internal damage. In this particular unit, you
688 can see the oxygen gauge came down quite a bit as a result of
689 an internal shock that was transmitted through the unit and
690 that should have been removed from service through the
691 inspection criteria at the mine. So those are the types of
692 things that we're trying to avoid, having that in service when
693 it shouldn't be in service.

694 New types of training packages are in the process of
695 being developed jointly by NIOSH and MSHA. We're focusing on
696 how to conduct proper daily and 90-day inspections, how to
697 better care for your SCSRs, how to don the SCSR properly, as
698 the older types of training videos have shown, but we're
699 several steps beyond that as you will see in a moment here.
700 The criteria for removing an SCSR from service is being
701 elaborated on. We're showing examples of when you should take
702 your SCSR out of service. The grey areas hopefully will be
703 cleared up and someone will get this type of training, they'll
704 know better how to inspect their SCSRs so we get out of that
705 red area that we showed you previously.

706 With respect to the training modules I referred to,
707 there's an agreement established between NIOSH and MSHA to
708 develop these modules and the PPO from the MSHA side we're
709 making good progress. We've got the first module videoed. It
710 was just sent to me. It looks like it's completed now. We're
711 working with a contractor here in the DC area called
712 PowerTrain to develop a computer-based training. Basically
713 they're taking the videos and other information we give them
714 and putting them into computer-based training disks and those
715 will all be distributed through our academy and sent directly
716 to mines also as requested. That's through an ongoing
717 contract funded by NIOSH. Once we get those modules

718 completed, we're going to distribute them as soon as possible.
719 MSHA personnel from our education policy and development will
720 be helping to distribute these out in the field. We'll be
721 distributing them through the academy and also as much as
722 possible put on our website. MSHA will emphasize that the
723 SCSR modules will increase the awareness out there and it's
724 actually a very high priority for us to do that. We're going
725 to have a new distribution type of system with respect to
726 getting information communicated. We're working with the
727 National Guard who has teleconferencing facilities in about
728 315 sites around the country. I was in discussion with them
729 about 2 weeks ago and they are thrilled to see that we are
730 going to be utilizing their facilities. MSHA, EP&D personnel
731 were at the meeting also. And one of the first broadcasts
732 we're going to make will be on the first module which is the
733 CSE module and following that we'll have the Draeger, Ocenco,
734 and MSA modules. Each module I referred to is a complete
735 package. Basically you got your training video, you're going
736 to have your computer-based training, instructor's manual, and
737 a screen saver. That package will be quite complete with
738 respect to training packages that can be used at individual
739 sites. Besides that --.

740 -- good participation with that. We started looking at
741 new types of concepts. I'm sure John's going to talk about

742 it, but one manufacturer has come up with a temperature sensor
743 incorporated in the strap on the lid of the SCSR. Basically
744 the dial here will change to black when the SCSR is exposed to
745 temperatures for a period of time at about 130 degrees which
746 is the maximum temperature the SCSR should be exposed to.
747 Also in the training videos it's being emphasized that we
748 shouldn't keep the SCSRs in the trunk of your car, extreme
749 cases of temperature bathhouses where temperatures can get up
750 high in the summertime, or next to heaters. Those types of
751 areas where you typically go to a mine and see the SCSRs
752 hanging high up in the bathhouse and temperatures can get up
753 way over 100 degrees. So we're trying to, again, have the
754 SCSR easy to determine whether or not it's been exposed to
755 temperatures beyond those that are recommended by the
756 manufacturer.

757 We talk about non-destructive testing. We're starting to
758 see SCSRs that look perfectly good when you look at them with
759 the normal inspection criteria, but they're may be internal
760 damage as I mentioned before. Some of these SCSRs will show
761 decreased life performance. We've seen that through the long-
762 term field evaluation metabolic simulator tests and in fact
763 some of these might have actually catastrophic failure, which
764 have massive internal damage and actually doesn't show up. It
765 might be vibrated tremendously. We're looking for solutions

766 for practical, non-destructive testing to sort out good SCSRs
767 from bad. There are two manufacturers that have already come
768 up with shake tests. CSE has come up with one and Draeger has
769 come up with a shake tester to determine if there's internal
770 damage by movement of the solid material inside of the unit
771 and they've made tremendous strides in helping to weed out the
772 bad SCSRs from the good. Adjusting the service life is
773 another potential solution. MSA last year readjusted their
774 service life on their SCSR because the shake test actually
775 didn't work. One of the ways that they were looking at was an
776 X-ray process but that process hadn't really materialized yet.
777 So you know there's other ways I'm sure that we can look at to
778 do non-destructive testing and it's really Government's
779 position to show the way and the manufacturers to actually do
780 what is required and to come up with new technology to do that
781 type of thing. I think it benefits everyone to have those
782 units actually called out that wouldn't perform. That's
783 exactly what we're trying to try to determine.

784 Here's an example of the CSE noise box tester that they
785 used at their facilities. At the mines there's a portable
786 noise tester that can be used for a shake test. Here's the
787 unit, the OXY K-Plus using the AMS from Draeger and again,
788 this is a very high-tech technical device that will determine
789 if there's internal damage to the unit. Other things that

790 have been looked at is neutron radiography X-rays, other types
791 of methods to do that, and again, the Government's trying to
792 show the way and we're anxious to see what comes from the
793 manufacturers as far as other ways to determine internal
794 damage through non-destructive testing.

795 With respect to the MSA and the adjustment of the service
796 life in their Life Saver 60, we actually did find some KO2
797 particles in the breathing circuit and some of these SCSRs
798 actually it was a very small quantity, but again, MSA was very
799 responsive and they actually took the action to reduce,
800 actually redefined what their service life actually was.
801 Basically that action occurred last year.

802 One encouraging, very encouraging thing that we noticed
803 over the last few years is that the problems that are being
804 identified by the long-term field evaluation program are
805 decreasing and the problems that are actually being identified
806 by manufacturers early on are increasing. So actually over
807 the last 2 years I think we get three soft reports from SCSR
808 manufacturers, actually SCBA manufacturers also telling us
809 where there may be a problem due to a QA type of an effort and
810 have identified these. They've jumped on it, they've actually
811 handled a situation, and it's extremely encouraging to see
812 that happening right now. Those problems weren't major
813 problems, but even the smaller types of problems affect small

814 amounts of units are being looked at from the QA perspective
815 much more intensely by the manufacturers and we're glad to see
816 that. So with that, any questions, I'd be glad to entertain
817 them?

818 **JOE LAMONICA, CONSULTANT TO BCOA:** Jeff you mentioned
819 about the metabolic simulator Man Test #4 in relationship.
820 We've had these discussions in the past and the industry's
821 been very supportive in moving towards using the metabolic
822 simulator, but a question also is that because Man Test #4 is
823 I believe older than I am, how valid is it? And has the
824 validity of Man Test #4 been certified so that we're building
825 on a valid base?

826 **JEFFERY KRAVITZ:** Actually Man Test #4 was developed
827 prior to SCSRs as you know. It was developed basically for
828 the longer duration SCBA types of apparatuses and then it was
829 applied to the SCSRs, but we've seen that it still holds up
830 with respect to a standard for SCSRs also. Now we've been in
831 discussion looking at international standards. Of course,
832 they use a totally different method of using their metabolic
833 simulators and I think that's something that has to be taken
834 into account too whether or not that the Man Test #4 is best
835 has been a question that we've been in discussions with. I
836 think we're going to be looking into this further. That's a

837 good point. Thanks. Anyone else? I think we're at our
838 break.

839 **TIMOTHY REHAK:** Okay, we'll take a schedule for our break
840 now. Take a half-hour and we'll start again at 10:00.

841 **(BREAK)**

842 **TIMOTHY REHAK:** If everyone wants to take their seat,
843 we'll get started again. Just one other announcement, we had
844 a question here. All these presentations will be posted on
845 the NIOSH website and they will also be available from the
846 docket office. So next, I'd like to introduce John Kovac with
847 NIOSH. He'll be presenting in-depth our new concepts for the
848 standard.

849 **JOHN KOVAC:** Good morning. What I'm going to talk about
850 are the mosaic of ideas or concepts that will be the
851 foundation of new standards. A cautionary remark, these are
852 points of departure, starting points. It is very far from the
853 finishing line so what we're going to look at are those ideas
854 which will lead to better apparatus, a more reliable
855 apparatus. Our objective has always been that no miner should
856 be forced to rely on part of SCSR for a mine escape that may
857 be unsafe. Escape means taking a miner on foot and under
858 oxygen from the deepest point of penetration in a mine to a
859 point of safety. We've seen this a little earlier. We have
860 what the units look like as well as their schematics. We're

861 looking at 1-hour approved units that have been deployed in
862 mines in this country and they differ principally in the way
863 that they store and release oxygen. Some of the units store
864 oxygen as solid potassium super oxide which also serves as
865 carbon dioxide absorber. Others store oxygen in the form of a
866 compressed gas and there's a separate chemical bed, which
867 functions as the carbon dioxide absorber.

868 We've seen the source of the problems which is the thing
869 which motivates us to look at new ideas, new concepts for how
870 to improve upon these devices. And we see that the split of
871 the problems is roughly on a par between reliability and
872 quality issues with training and other issues related to
873 training making up the rest. And we based our analysis on
874 roughly 10 years worth of information. We've based on our
875 analysis on a very hard learned lessons about how these
876 devices work, how they could fail, what steps make sense in
877 terms of how they should be tested, what steps make sense in
878 terms of how we should react to these issues, what an
879 effective reaction happens to be.

880 One of the vexing problems deals with service life and
881 let me remark this. Service life plans do not assure that
882 every unit would remain in service for the entire duration,
883 nor were they ever meant to. Some of the units as we well
884 know are over-exposed to damaging conditions and sometimes

885 reveal themselves and make them removable from service. We
886 also know that environmental conditions of shock, vibration,
887 and heat are the culprits which cause damage to the units.
888 Sometimes this damage is evident and obvious to visual
889 inspection. Other times the damage is hidden and requires
890 non-destructive testing techniques or making the unit self-
891 reporting.

892 To look at some of the problems of the past, we've seen
893 chemical migration meaning the potassium super oxide has left
894 a contained bed and moved into the breathing circuit.
895 Potassium super oxide is a powerful irritant. And the unit on
896 the left-hand side, if you encounter a unit in that condition,
897 it would be unusable. Just as problematic, the unit on the
898 right-hand side, we have a breathing hose deterioration caused
899 by over exposure to heat. Literally when the unit was opened
900 up and inspected, the hose fell apart rendering the unit
901 unusable. In both cases, damage to the unit was invisible,
902 was not evident from visual inspection, and a user would
903 encounter that only upon opening it and trying to don the
904 unit.

905 Our goals and objectives are many, primarily they're to
906 provide safe apparatus. We want these standards to focus on
907 consistent behavior of the devices. The standards must be
908 logically strict and avoid ambiguities of interpretation. We

909 want certification predicated on performance rather than use
910 of deployment. We want to avoid human test subjects for
911 controlling the outcome of the performance trials. We talked
912 about an umbrella of shared responsibility, roles that the
913 manufacturer logically plays, roles that the user must play in
914 order for the devices to remain safe, and the role that the
915 Government must play in certifying these devices. Ultimately,
916 we want to make the units easier to inspect and we would like
917 to see pass/fail indicators embedded in the units for
918 temperature and mechanical shock making hidden damage evident
919 to visual inspection. We have a philosophy and we've looked
920 at that. We want to be able to approve the simplest of
921 designs that meet appropriate performance requirements.
922 Simplicity always leads to ease in use, greater confidence,
923 and greater reliability.

924 Our umbrella concept of shared responsibility beginning
925 in a pre-deployment stage where we're talking about approval
926 and quality control at the point of manufacturer and then
927 moving on to what happens in deployment, how we discover and
928 respond to problems. We emphasize training, not only training
929 and how to handle it, inspect the units, but training in an
930 effective use to build confident that a miner can make an
931 escape under apparatus in the event of an emergency. We also
932 talked about early detection, auditing. We would like to make

933 the units self reporting, supplement that with certain kinds
934 of non-destructive testing so that it is evident when a unit
935 should be removed from service. We have expanded the long-
936 term field evaluation already in part to detect problems and
937 finally we would like to talk about effective reaction meaning
938 registration. Talk a little about that. One of the most
939 vexing problems we have upon discovering a problem with a
940 device is this. How many are affected and in whose hands are
941 they, how do we recover the devices, what should we do to
942 replace them, how many need replacing in the like? Oftentimes
943 these problems weigh heavily on what the Government can do
944 working in concert with the manufacturers to make good a bad
945 situation. The more we know about how many units are out
946 there and whose hands they are, what their condition is, we
947 then can target what we have to do to correct the problem.

948 Our proposed actions include:

- 949 • breathing and metabolic simulator testing to
950 depletion,
- 951 • ruggedness and reliability regulations up front rather
952 than an after matter,
- 953 • safety requirements so that the units because they
954 store oxygen should not contribute to or add to the
955 risk of deployment,

- 956 • what counts as good eye protection because all the
- 957 units so far include goggles for eye protection,
- 958 • audits meaning long-term field evaluation and the
- 959 like, and finally
- 960 • registration.

961 Why do we want to look at a breathing and metabolic
962 simulator? First of all we'd like to provide a uniform basis
963 for evaluating how well the SCSR deploys, how well the SCSR
964 functions not only at the point of manufacture and when it's
965 new, but any stage of its deployment. We would like to do
966 work which is statistically sound and scientifically valid.
967 We want to increase the confidence in which we make our own
968 judgments that we know when a unit should be removed from
969 service or when a unit is not functionally well. With the
970 simulator we can continuously monitor performance of an SCSR.
971 We can and will determine that performance to depletion of
972 breathable gas supply, but because these devices are meant to
973 protect human beings under the worse conditions, we will
974 retain human subject testing as an approval criteria.

975 We have a photograph of our simulator. It is a computer-
976 controlled breathing machine and it allows us to duplicate
977 human respiration in a mechanical fashion. It allows us to
978 conduct controlled and repeatable tests of breathing devices.
979 We have learned so far how to program the simulator to become

980 a replica of Man Test #4, which is the test for duration. We
981 do so for the 95th percentile miner. 95th percentile miner is
982 someone who weighs in metric units about 100 kilos in English
983 units about 220 pounds. We have also tested units in at a
984 fixed work rate and we can program the simulator to duplicate
985 only that which humans can accomplish rather than look at
986 situations which are untypical and extreme.

987 Human subject testing - we work with calibrated test
988 subjects meaning that we know what treadmill speeds to run
989 them so that we can elicit the work rate that the simulators
990 programmed out is a constant work rate. We learn how a person
991 reacts to changes in SCSR performance and we regard the BMS
992 tests as a surrogate for human subject testing. So we have a
993 check and balance in place. We know that the unit works well
994 on the machine. We then can commit it to a human subject. We
995 can learn how a human subject reacts and we have checks and
996 balances in place so that our results are scientifically valid
997 and applicable.

998 Ruggedness and reliability - we would like to establish
999 baseline ruggedness in terms of robustness to shock, vibration
1000 and temperature extremes. We would like the units to be
1001 objective in the sense that they self report on readiness
1002 either by visual inspection supplemented with non-destructive
1003 testing. We would like to see embedded on the units

1004 temperature indicators, trauma or shock indicators, wear
1005 indicators, and finally we'd like to see the units in some
1006 kind of tamper-resistant packaging to avoid any kind of
1007 counterfeiting which we've encountered in the past. The
1008 notion is very simple. Miners can be trained to inspect the
1009 units. Sometimes the inspections aren't obvious. We know how
1010 to correct that, would like to make the units additionally
1011 more robust, and would like the units very straightforward on
1012 inspection.

1013 Non-destructive testing means a lot of things, but right
1014 now it encompasses a variety of techniques some of which have
1015 been approved and deployed in the field. They include noise
1016 testing. The chemical bed of an SCSR whether it's potassium
1017 super oxide or whether its lithium hydroxide consists of solid
1018 particles interspaced with voids. Due to repeated shock and
1019 vibration, those solid particles could grind down into a finer
1020 size consistency. When that happens, how well the unit
1021 functions is jeopardized. Sometimes the chemical could
1022 migrate to the breathing circuit. One way of detecting that
1023 condition is to measure the noise that the unit makes when you
1024 shake it. Measure it in a very scientific and controlled way.
1025 So far two manufacturers have deployed tests of that nature.
1026 Another way of doing it is very exotic and at the bottom right
1027 on the label neutron radiography we could literally turn the

1028 units transparent. This is very experimental and
1029 unfortunately very expensive to do. But we could do that as a
1030 point of interest. If we look at the unit on the left-hand
1031 side, that is a unit that has been subjected to shock and
1032 vibration and would not pass the noise test nor would it
1033 perform as well as a new unit and should be removed from
1034 service. On the right-hand side, we have a brand new unit and
1035 what you see on the left is the additional voids created by
1036 the particles grinding down into each other. So we know that
1037 the noise test does what we think it should do. It detects
1038 the increasing amounts of voids and the particle-size
1039 distribution of the bed.

1040 Safety requirements - The units store oxygen, if we're
1041 going to deploy them in mines and some other environments,
1042 they should not be the cause of the problem in which they are
1043 intended to protect against. We would not like area
1044 production to introduce new risks in terms of fire or
1045 explosion hazards. We have tested units post-approval to see
1046 that wasn't the case. Our recommendation would be to bring no
1047 safety testing into the pre-approval realm.

1048 Eye protection - The units include goggles. The notion
1049 of what these goggles should do is always been questionable.
1050 The quality of the goggles, how they should fit, should they
1051 fit over glasses, questions of that sort have always come up.

1052 The goggles should be anti-fog. They should be gas and vapor
1053 and smoke resistant. The goggles that are different quality
1054 we will have goggle specifications in terms of both safety
1055 properties and visual acuity properties.

1056 The reasons we want to conduct audits - post deployment
1057 auditing is needed to ensure that whatever standard we have
1058 delivers the desired level of performance over the entire
1059 deployment life of the unit. In other words we would not want
1060 to see a unit that as it ages within the system, loses its
1061 life-support capacity, loses its ability to protect the user,
1062 and that loss of capability is not detected either by visual
1063 inspection. So at some level, this is a layer of redundancy
1064 to make sure that the deployment works as intended.

1065 Registration - Again, the vexing problem is this. Some
1066 difficulties, some imperfections, some failure is detected,
1067 it's deemed to be life threatening. The issue becomes how
1068 many units are out there and in whose hands are they? How can
1069 we begin recovering them? How quickly do we have to recover
1070 them? Therefore, we would like information which tracks who
1071 has the units, how big the market is. It would improve our
1072 auditing capability and would really help us to determine the
1073 potential extent of problems. Finally, are there any
1074 questions regarding our intentions?

1075 **JOE LAMONICA, SEA GROUP:** I have heard from two speakers
1076 that this is your goals and objectives and philosophies. You
1077 are asking for better indication for pass and fail of this
1078 kind of equipment and then you are saying that we want to see
1079 simplicity in design. I think that this is difficult and may
1080 be there should be simplicity in use and application instead
1081 of simplicity in design because how you design to achieve the
1082 goals probably not of your concern. Your concern is that the
1083 use is simplicity and not how we design.

1084 **JOHN KOVAC:** I won't debate you on that distinction.
1085 Simplicity of use is a goal. Simplicity of design we would
1086 need things for instance doing away with starter mechanisms,
1087 things like that to make the activation process very
1088 straightforward, other features of that sort. So now I'm not
1089 going to debate you on the distinction that you drew. Anybody
1090 else?

1091 I'm (inaudible) Hines from (inaudible) Safety: I'm
1092 missing intrinsic safety in your investigations.

1093 **JOHN KOVAC:** Intrinsic safety would be the issue of fire
1094 and explosion hazards, but intrinsic safety strictly speaking
1095 would be MSHA and electrical safety. These units are not
1096 electrical. They don't have ...Go ahead speak something, say
1097 something, Jeff, yes, go, come up here.

1098 **JEFFERY KRAVITZ:** If you're looking for electrical
1099 components, that would be SCSR or are you looking at SCBAs?

1100 **(INAUDIBLE) HINES:** I'm looking at the surface of the
1101 unit which has to be electrical. It cannot produce sparks to
1102 cause an explosion.

1103 **JEFFERY KRAVITZ:** Yes, static electric types of issues.
1104 In some countries that's a requirement, but in our mines,
1105 that's not a requirement for having those units. Like
1106 Australia, they got breathing bags that are static electric
1107 resistant, things like that. No, we haven't addressed those
1108 types of things. That's not a requirement here in the United
1109 States.

1110 **JOHN KOVAC:** Any more?

1111 **MONFRED KRAUSER, DRAEGER SAFETY:** You spoke about
1112 reliability requirements, about shock, vibration, and
1113 temperatures and you said we want to try to take extreme
1114 limits for testing. Everything is possible for the
1115 manufacturers. If you look for such extreme limits, please
1116 look for the limits which you can reach in the practice
1117 because sometimes it happens as that everyone gives a little
1118 bit more than what is necessary and there comes a day when we
1119 have to produce a unit which fulfills its standard but is not
1120 a benefit for the user. Especially you spoke about
1121 temperature and temperature control and temperature indicator

1122 that was the word, we say in our instruction for use that all
1123 units are good for 50 degrees and there are a lot of
1124 temperature tests in the literature for plastic materials, for
1125 rubber, and so on where you have a short time aging at
1126 70 degrees at 100 degrees Celsius to get fast results on
1127 aging. If you transfer this also for an aging test for the
1128 whole unit, we have to use other materials because this
1129 plastic material will withstand 100 degrees Celsius test but
1130 other materials doesn't do so because it's not a plastic.
1131 That's difficult to explain, but we have to say it in two
1132 parts: the material and the function of the unit.

1133 **JOHN KOVAC:** First, we agree. Second when we looked at
1134 your Draeger OXY 60B as well as your OXY-K Plus and we exposed
1135 them to the shock and vibration and temperature ranges that we
1136 tested against and we've reported in what was then the Bureau
1137 of Mines RIs and that would be NIOSH reports. Your unit as
1138 well as the other units that are deployed in the mines in this
1139 country passed that. Okay, so those extremes were not so
1140 extreme that the units couldn't function. I think that we're
1141 sensitive to what prototypical and practical temperature and
1142 stress limits happen to be and we will not exceed those in any
1143 sense. Second of all, I'm not sure there is a second of all,
1144 but we're sensitive to that requirement. Placing levels which
1145 are too high would make a unit unusable in some sense, not

1146 very practical. We have a good handle on what temperature
1147 extreme should be. We've tested units against those. You're
1148 units have faired well in both cases, both in 1981 and correct
1149 me 1992 or whenever the K-Plus came into being. So I don't
1150 think that is an issue. That's it. Any further questions? I
1151 think we have speakers. Let me get out of this.

1152 **TIMOTHY REHAK:** Next I'd like to call on Joe Main. He's
1153 an administrator for the Department of Occupational Health and
1154 Safety for the United Mine Workers of America. Mr. Main.

1155 **JOSEPH A. MAIN:** I appreciate the opportunity to be here
1156 this morning and what I would like to do first is to pass on
1157 some well deserved appreciations to NIOSH, the crew that has
1158 been working on the SCSR issues over the past number of years
1159 and really stepping up to the plate and tackling a real
1160 problem that it is important to the Nation's miners. To
1161 NIOSH, the way your whole crew, Rich, John, and the other
1162 folks who have worked on this, I think that we've seen the
1163 results of some very hard and dedicated work here this
1164 morning. I would also like to pass on some appreciation for
1165 the work done by Jeff's crew out of tech support with regard
1166 to the field audits and although we still think we need to do
1167 more we appreciate the direction we're moving because those
1168 field audits are very important. I think that the beginning
1169 and the end of my point here and what everything that circles

1170 around is the fact that we raised many times in many previous
1171 meetings and hearing and open forum what we are seeking here
1172 is a reliable, self-contained self rescue unit that is readily
1173 available for miners. When they need it, it's there. It
1174 works the way it should and it gets them out of harm's way and
1175 that sort of like I said the beginning and ending of our
1176 concerns. Over the past 12 years I would say, we've had a lot
1177 of discussions about what is needed to bring that about and a
1178 lot of those I've seen encompassed in the presentations today
1179 and we're very appreciative of that. We're appreciative that
1180 this Federal institution is actually listening to miners, what
1181 miners have to say, and are moving forward. A lot of the
1182 miners don't get to see what you guys do behind the scenes and
1183 they just get to see what the end product is and that's the
1184 way life usually works, but I think again on their behalf,
1185 you've done a tremendous amount of good work for them to
1186 improve their life. I remember some discussion some time back
1187 you know there may have been a feeling that well mines are a
1188 lot safer today. This is not as important an issue as it was
1189 in 1981 when we started to launch the self-contained self
1190 rescuers in the mining industry.

1191 Last night about 12:05 a.m., an accident happened at the
1192 VP No. 8 mine in Virginia that just reminds us all that's just
1193 not true. Last night there was a fire in the belt entry of

1194 the mine which caused the complete evacuation of the mine and
1195 required rescue teams to come to the site and extinguish the
1196 fire. Those are the things that reminds us about what this
1197 whole debate/discussion is all about, making sure those miners
1198 that get caught in those situations have the readily available
1199 reliable unit to use.

1200 But I would just like to sort of step back a bit and just
1201 sort of just lay out this picture of reality that we are still
1202 in the time when these units are still in great need by
1203 miners. If you just look at starting back on September 23,
1204 2001, and just working forward just some of the events that
1205 happened in the mining industry that I think that proves the
1206 point that this is a real important project that we're working
1207 with here. On September 23, mine explosion ripped through the
1208 Jim Walters No. 5 mine in Alabama claimed the lives of
1209 13 miners put a number of miners in jeopardy over a period of
1210 time including at least a dozen of the miners who perished who
1211 went back into the mine to try to aid in the rescue of a miner
1212 that was down. Unfortunately those miners never escaped the
1213 initial accident that entrapped the miner.

1214 On April 17, 2002, a fire broke out in the conveyor belt
1215 entry in the Blue Diamond No. 77 mine in Kentucky. It was not
1216 probably picked up by a lot of folks. It was one of the mine
1217 fires that happen, not highly reported, but at the end of the

1218 day, it placed the miners at risk that was in the mine. It
1219 placed rescue workers at risk that had to go in and try to
1220 extinguish the fire. As we speak today, a year later, that
1221 mine is still sealed from the mine fire.

1222 On July 24, 2002, anyone in the room who hasn't heard
1223 about this one probably hasn't been on the planet that we live
1224 on. Eighteen miners were caught in an inundation at the Cue
1225 Creek Mine. Thanks to a phone call that was quickly made to
1226 workers on one section, nine of those miners were able to
1227 escape through the flooded waters and get out of the mine and,
1228 of course, we know the rest of the story that nine miners were
1229 trapped in a situation where the mine was flooded. They had
1230 both the bad air and the water that rushed in from an
1231 abandoned mine that thanks to the good work of some fast
1232 thinking rescue folks, tech support, State of Pennsylvania,
1233 those miners are thankfully alive today. Again, that reminded
1234 us and I was always asked this question. How did those miners
1235 breathe down there? Thank God for compressed air and holes
1236 and sort of bubbles or vacuums that gets created, but part of
1237 the equation in situations like that you know there's a need
1238 for having rescuers or self rescuers for miners to have the
1239 ability to have another breathing source.

1240 September 16, 2002, many may never have heard of this
1241 one. Fairfax No. 3 mine in West Virginia, a mine fire,

1242 another belt entry mine fire caused the evacuation of the
1243 mine. There's 28 miners was placed at risk for a period of
1244 time until the mine was evacuated and, of course, the miners
1245 and rescue workers had to extinguish that fire.

1246 November 13, 2002, about 10 miners who were working at
1247 A.T. Massey's Elk Run Coal Company, Castle Mine, in West
1248 Virginia, were endangered when they cut into an abandoned
1249 workings and the mine was flooded again.

1250 On January 3rd of this year, there was another inundation
1251 although shorter lived and didn't end in the extent of
1252 probably rescuers but again it raises a point, did place
1253 miners at risk. Three miners were injured at the Peabody
1254 Hallem Mine in western Kentucky when they cut into a return
1255 shaft had about 100 feet of water in it, went unchecked before
1256 the mining cut through took place.

1257 January 6, 2003, a crew of miners escaped a fire in the
1258 84 Mine in Pennsylvania when a belt fire struck. Those miners
1259 were able to evacuate the mine and it took several days for
1260 the rescue workers to extinguish that fire.

1261 January 23, 2003, an explosion at the Consol Energy
1262 McElroy Mine claimed the lives of three miners.

1263 February 13, 2003, a mine fire struck the Consol's
1264 Loveridge in Northern West Virginia. I got to personally talk
1265 to one of the miners shortly after the escape. There were

1266 some very lucky miners there. One of the miners was down and
1267 they had difficulty getting him out. The smoke overtook the
1268 area fairly quickly and we were very fortunate not to have
1269 some life fatalities there. And, again, last night at
1270 midnight, you know another mine fire.

1271 These are events that just happened over the last few
1272 months and actually all but the Jim Walters was in the last
1273 year. So for those who think that we have moved beyond the
1274 time that there's an importance for these devices, I think
1275 that that thinking is best said to be dead wrong.

1276 With reliability issues involving the units, there have
1277 been a number of problems that have been identified with the
1278 self-contained self rescuers over the last several years and I
1279 know from time to time I get the telephone calls that we have
1280 found another one and we have found another one. I recall
1281 during the recovery of the Jim Walters Mine I got a call in
1282 the evening where we had a defect in a self rescuer that just
1283 had been identified and it was one of many. It's too common
1284 place in this industry for this kind of a problem to exist.
1285 The fortunate thing about that one as has been many other
1286 recent cases is that we've been able to maintain a tracking
1287 system that allows us to quickly identify the mines and to
1288 take some very expedient action to advise the population of
1289 people, miners, and mine management that they're there. In

1290 those serious cases, get them out and I think we need to not
1291 only reinforce that but look at ways to make that system work
1292 even better. I think within a few hours after those calls I
1293 know mines that we represented the miners we had a plan of
1294 action and had the defective units pretty well out of service.
1295 We don't want to have those kinds of problems, but we need to
1296 have that kind of response to deal with the units when we do
1297 run into problems. And I think that's one thing that we all
1298 need to understand.

1299 I've had only a brief opportunity to go through the
1300 presentations and I apologize because I just came back from
1301 another mine fire. We were in the process of working on
1302 reopening the Loveridge Mine that caught fire last February
1303 and haven't had a chance to really go through in entirety all
1304 the presentations here today. But I had a chance to go
1305 through quite a few and as John's last presentation about the
1306 work that's being done and we support that. The field work
1307 that Jeff had to outline in his presentation, we supported
1308 that and there was about six items in the letter that was
1309 forwarded out to the general population dated March 12th of
1310 issues that NIOSH is considering work on. In each of those
1311 areas without going into any detail, I just want to let NIOSH
1312 know that the items on the March 12, 2003, letter that was
1313 listed we do support those actions and have in the past been

1314 have commented on having those as issues that NIOSH needs to
1315 work on and bring to closure. We are appreciative of the fact
1316 that NIOSH has moved forward as they had promised a couple of
1317 years ago to install the field testing, to move forward on
1318 regulatory changes, to move forward on the testing and
1319 analysis programs at the facilities in Pittsburgh and are in
1320 support of continuation of those. We are at the same time a
1321 bit disappointed that MSHA had chosen to withdraw regulatory
1322 action on connecting pieces of this which has been likewise
1323 heavily discussed over the last several years and we think
1324 that those are equally important to make this whole SCSR
1325 program to gain any improvements that are actually needed for
1326 miners. You know things that were talked about briefly on
1327 shelf life of units. That's absolutely important. We need to
1328 figure out what the real shelf life of a unit is and its
1329 useful life during that time frame. We don't need units in
1330 place that has exhausted their shelf life in that they become
1331 defective and unreliable. The SCSR deployment strategy was
1332 briefly talked about this morning I think by John which has
1333 been a concern that we need to address. What is it that we
1334 want these SCSRs to do? We do need these SCSRs to be balanced
1335 against each other using metabolic simulators so we can
1336 identify what the real comparative life of a unit is, but we
1337 need to understand that there are other strategies here that

1338 need to be addressed as well and that is at what point do you
1339 think that miners are safe when they have an emergency in the
1340 mine. Is it just during the life of a unit that may under the
1341 circumstance of an individual miner last only 45 minutes and
1342 that's the end of his unit? Or is it a strategy that takes
1343 him the furthest point that the miners in that mine to get him
1344 outside? We believe it's the latter and we believe we need to
1345 have quality units that are built and reliable and will
1346 provide the kind of coverage for that miner to permit a full
1347 escape from the mine not just back to a point we hope that the
1348 environment is okay there. If you look at the case at
1349 Loveridge where we just had a recent mine fire that fire was
1350 headed slow bottom right at an exit point from the mine.
1351 Miners were lucky to be at that point, but if you look at air
1352 currents and air flows there's a possibility of miners on in
1353 by to be contaminated by the by-products of the fire and this,
1354 again, what is it we want the miners to have. Is it a one-
1355 unit escape that has a set amount of time or a unit or units
1356 that will get the miner out of the mine to safety? We believe
1357 that those things have to be addressed and we would urge that
1358 MSHA reenact its role making that was withdrawn on
1359 December 2001 to start addressing those issues.

1360 I'm also concerned. I just recently received the budget
1361 for MSHA for 2004 and there was a disturbing a number of

1362 disturbing budget items in that, but one of them was involving
1363 tech support. It calls for a \$4 million cut from the tech
1364 support branch and it also calls for a cut of about
1365 33 personnel and I sat back and tried to understand where is
1366 it that this personnel is going to come from. Is it going to
1367 come from those folks that we now have at Loveridge that is
1368 there as a absolutely important crew this monitoring the mine
1369 environment? Is it going to come from the diesel crew that is
1370 in approval and certification that tests and monitors the
1371 diesel equipment? Is it going to be from the crew that
1372 analyzes the approval and certifications of electrical
1373 equipment that goes underground? Is it going to be the
1374 Jeff Kravitz's crew that is out here doing these field
1375 studies? I have no clue, but there's not a large population
1376 of people to pull from and I think that we all need to be
1377 mindful of things like that. That while we plan these
1378 strategies which we support of these field studies that there
1379 maybe some unintended consequences here with unwise budget
1380 cuts and some of these branches of the agencies that undercut
1381 the best laid plans --

1382 ... Importance of all the roles that the NIOSH tech
1383 support folks play in providing a well rounded technical
1384 support assistance role to the mining community and
1385 particularly to miners. It is important for any discussions,

1386 to have the equipment manufacturers here, if there are
1387 problems as this thing proceeds forward, that we can sort
1388 those out because at the end of the day, I think, one of the
1389 things having a simple product is important, and to miners
1390 it's darn important if your caught in a crisis and an
1391 explosion just rolled over you and blew you to the ground and
1392 how do I get this thing to function. That is very important
1393 to have a simplistic unit there that you don't have to do a
1394 lot of thinking about. I've been trained, probably the most
1395 trained fellow in the world, because all these mines I go to I
1396 get SCSR training. I've often thought, put myself in this
1397 crisis, what do I do? Of course, I've been trained on so many
1398 units some times, do I have a Draeger now or have I got a CSE
1399 unit but that is a real problem and I think we've determined
1400 that in the past, when you put miners or human beings in a
1401 crisis situation they think differently than their normal
1402 thinking. So it is necessary to have a simple minded unit and
1403 we would like to see the manufacturers move even more towards
1404 that end. If you look at the, going back to the other end of
1405 the spectrum, the problems that we have had with self-
1406 contained, self-rescuers as one of the earlier slides showed,
1407 I think it was something like 80% deal with something on the
1408 manufacturing side of quality control, defects in the units.
1409 That's troubling, in that, we've got to figure out ways that

1410 we do not have these phone calls coming at 9:00 at night or
1411 through the middle of the day of another defect that as been
1412 found. Some of these, I think we all agree, have been minor,
1413 in terms of their threat to their usage but some of them have
1414 not. I've seen some of these units that have been pulled
1415 apart where, I mean forget breathing anything past that
1416 mouthpiece. You have a degradation of hoses; you have caustic
1417 dust that can get sucked into the miner's lungs. I know what
1418 would happen, just from a normal standpoint, if I would suck
1419 that caustic dust into my throat, I wouldn't be breathing
1420 through a tube; I would be trying to cough that out and
1421 breathing the outside air. The temperature problem, I don't
1422 know and we hope that the research folks figure out why those
1423 tubes degraded, is it temperature, is it poor quality
1424 material? Whatever it is we need to get those kinds of things
1425 fixed. But I would urge a great collaboration between the
1426 manufacturers and the NIOSH researchers, as we find these, to
1427 really get to the bottom, figure it out, fix it, and try to
1428 get to a point where we have these quality control problems
1429 behind us. With that again, thanks you very much for your
1430 hard work and that's all I have.

1431 **TIMOTHY REHAK:** Okay, at this point, that's all the
1432 outside speakers we have, that's all the presentations we were
1433 planning on providing. If anyone has any comments that they

1434 like to have part of the public meeting, part of the official
1435 record for this meeting, please come up. If you have any
1436 questions, comments, again, come up; state your name and who
1437 you represent.

1438 **JOE LEMONICA, CONSULTANT FOR BCOA:** I have a comment
1439 relative to one of the points that Joe Main made. It has to
1440 do with, when a problem is found we get involved in a recall
1441 situation in trying to solve that problem. Joe and I dealt
1442 with this quite a bit jointly and it got to the point where we
1443 convinced both agencies, NIOSH and MSHA, that maybe we can get
1444 a better solution sometimes to the problem if it involves
1445 representatives of the miners and representatives of the
1446 industry, in trying to resolve the problem that has been
1447 identified. It got to the point where a Memorandum of
1448 Understanding was written by both NIOSH and MSHA to that
1449 effect. I think that MOU's sort of deteriorate over time with
1450 changing personnel and what have you. I would just make the
1451 comment, as you write this regulation, that whether or not the
1452 regulation has the action plan that you will take when you
1453 identify a problem that wherever that is written down it
1454 should, part of that action plan should be that the
1455 representative of the miners and representative of the
1456 industry be notified at the initial stage not after the
1457 government has determined that they've come up with the

1458 solution. Sometimes it's not the best solution so a broader
1459 involvement of both manufacturers, the government, the miners
1460 who are using these things and the mine operators may lead to
1461 a better solution. Thank you.

1462 **GÖRAN BERNDTSSON, SEA GROUP:** Just a question here, I
1463 heard again about importance on simplicity of a device and I
1464 also heard a request of a device lasting long enough to get
1465 entirely out of the mines. Did I hear that right? Yeah. It
1466 is considerable different in metabolic rate depending on the
1467 size and the weight of the miner. If you want to get a
1468 130-pound miner out of the mine or a 230-pound miner out of
1469 the mine walking himself out. The performance of that piece
1470 of equipment is quite a considerable difference, would it be
1471 an acceptable solution to have different classifications based
1472 on body size and weight of the person.

1473 **TIMOTHY REHAK:** At this point and time, we are not
1474 looking at that now.

1475 **JOE LEMONICA:** If I could just clarify the point I was
1476 making. I think what we all understand is different units
1477 provide a different duration of oxygen to the miners. It is
1478 important to have the metabolic simulator system set up to be
1479 able to identify what those are. I think there is some models
1480 that have been developed that give some ratios of ages and
1481 population of miners. The key with that is to take that

1482 information, whatever it is, and develop a strategy to get
1483 miners all the way out of the mine. That is, not to have a
1484 miner that may have to travel 7 miles, relying on one SCSR as
1485 all that is available to that miner that may only last 49
1486 minutes. We need the strategy for getting the miners out of
1487 the mine. That's where this issue gets back to MSHA, which
1488 has been something that has been discussed. We've raised it
1489 time and time again to finalize those SCSR deployment plans,
1490 storage plans, strategy plans to fix this problem.

1491 **TIM REHAK:** Correct. Does anyone else have questions,
1492 comments on any of the presentations?

1493 **RICH:** I would welcome and encourage comments from Göran
1494 Berndtsson and a manufacturer, with regards to his ideas, with
1495 regard to rating devices based upon physiologic capacity. A
1496 1 hour device might not be the same for every individual and I
1497 think his point was if the individual's physiology demands
1498 more oxygen than someone else's, is there some way that a
1499 label, or information can be provided that would indicate the
1500 rating of the device in some way, that you would know that you
1501 got the right match for you with the different approved
1502 devices. I would welcome him to meet with us and go over
1503 information, also, provide information for the docket on his
1504 ideas.

1505 **TIMOTHY REHAK:** Right, again like I said, if anyone
1506 wishes to have a one-on-one meeting with the government,
1507 please contact me; my name, phone number, e-mail address, is
1508 in the back of the information you got. Yes, we are willing
1509 to meet with anyone. Any other questions?

1510 **(UNIDENTIFIED SPEAKER):** When do we get the numbers,
1511 which are planned for breathing metabolic simulator, for the
1512 breathing rates and so on?

1513 **JOHN KOVAC:** Those would be in the regulation, you are
1514 asking for details now. We talked about concepts not details.
1515 Second, you have a stream of our publications from the Bureau
1516 of Mines, as well as NIOSH, these days and those numbers are
1517 in there. Okay.

1518 **TIMOTHY REHAK:** Any other questions? If not, that ends
1519 our public meeting for today. Again, the transcription will
1520 be available at the docket office. Their phone number and
1521 everything is in the back of the information. Also, all the
1522 presentations will be put on the NIOSH/NPPTL website. Any
1523 questions or information you need, my name, phone number,
1524 e-mail address is in there so please contact us. Thank you.

(END)