REGULATORY ANALYSIS OF FINAL REVISIONS TO 10 CFR 20, SUBPART H, RESPIRATORY PROTECTION AND CONTROLS TO RESTRICT INTERNAL EXPOSURE

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1. Statement of the Problem

With the exception of the May 1991 revision to 10 CFR Part 20 that, among other things, required licensees to maintain the sum of internal and external dose as low as is reasonably achievable (ALARA), the Nuclear Regulatory Commission (NRC) has not made substantive technical changes in its regulation on the use of respiratory protection by it's licensees in several decades. In the interim, the NRC has substantially revised regulation 10 CFR Part 20 to reflect new radiation protection recommendations with regard to primary dose limits and dosimetric models. The NRC has now prepared amendments to Subpart H ("Respiratory Protection and Controls to Restrict Internal Exposure") of 10 CFR Part 20 revisions to Regulatory Guide 8.15, "Acceptable Programs for Respiratory Protection." NUREG-0041 (Rev. 1), "Manual of Respiratory Protection Against Airborne Radioactive Materials" is expected to be published following the final rule. These changes reaffirm the Commission's intention to reduce the unnecessary use of respirators when their use does not optimize the sum of the Deep Dose Equivalent (DDE) and the Committed Effective Dose Equivalent (CEDE), or Total Effective Dose Equivalent (TEDE). Instead of relying on respiratory protection devices, licensees are required to consider the use of process and engineering controls, filtered ventilation systems, decontamination of work areas, control of access to radiological areas, limitation of exposure time, and use of other types of exposure controls. The new regulations and guidance generally endorse the use of ANSI standard Z88.2-1992, "American National Standard Practice for Respiratory Protection," with a few exceptions. This ANSI standard represents the most current industry guidance for the use of respiratory protection when other ALARA-based alternatives are not practicable. The new NRC standards are designed to be consistent with the new OSHA regulations at 29 CFR Parts 1910 and 1926. While licensees are required by Part 20 to use one or more of the alternative control practices discussed above (i.e., avoid use of respirators in most circumstances), respirator use would be permitted if the practice will help to optimize the TEDE. Respirators might also be used in situations where:

(1) non-radioactive nuisance dust is present in the work area, or
(2) workers and/or the health physics department are in a relatively short-term learning process or making a transition from routine use of respirators, or
(3) the use of certain respiratory protection devices reduces heat stress on workers, or
(4) they are used as contamination control devices in high contamination but relatively low airborne radioactivity areas with the potential for significant resuspension, or
(5) a worker requests a respirator when the licensee has determined that use of a respirator is not needed, or
(6. they serve as a precautionary measure in which there is a large uncertainty in the magnitude of the projected concentrations of airborne material to which workers might be exposed.

In all cases, respirators should be selected to have the least possible impact on worker function (e.g., stress from heat, breathing resistance, ability to see and communicate). These and other options are permitted by the rule change, which also revises the current table of respirator assigned protection factors (APFs) to reflect the latest information and experience available.

2. Objectives of the Rulemaking

The objective of the rulemaking is to update current NRC requirements for respiratory protection programs at licensee operations and to reduce regulatory burden while increasing flexibility. Every effort was also made to minimize any impacts of the changes on licensees.

3. Alternatives

A summary of the changes is provided in the preamble to the final rule. In most cases, the changes are made for purposes of improving operational safety, increasing operational flexibility, or for purposes of clarifying the intent of the existing rule (based on information collected since the new Part 20 was promulgated in 1991).

Retaining the current rule represents the "NO ACTION ALTERNATIVE," which the NRC found unacceptable. The NRC believes that there is a need to redefine acceptable levels of respiratory protection to be consistent with new ANSI guidance and the new OSHA regulations. The current rule is too inflexible for good health physics practice, because it does not permit the use of devices such as disposable respirators and supplied air suits and is out of date with respect to assigned protection factors. Most of the proposed changes are not expected to change the regulatory burden, and therefore have no regulatory consequences. Only those changes which carry the potential for any increase or reduction in current regulatory burden are addressed in detail in the section below and in the value/impact analysis.

4. Consequences

(1) Deletion of the current § 20.1703(a)(4) removes the requirement that licensees prepare a written policy statement on certain aspects of respirator usage. Deletion of this requirement is expected to reduce the regulatory burden. That is because, in practice, the current rule at § 20.1703(a)(3)(iv) effectively requires that licensee procedures (containing all of the elements currently required in the policy statement) be updated and reissued each time a licensee significantly changes its respiratory protection program. The potential impacts are analyzed in the value/impact analysis (Section 5).

(2) A change to the current § 20.1703(a)(6) clarifies that licensees are required to make provisions for vision correction, adequate communication, and added safety to workers using respirators at low temperatures.

The only additional requirement is that licensees are explicitly required to take into account the effects of adverse environmental conditions on the equipment and the wearer. The inability of the wearer to read postings, operate equipment and/or instrumentation, or properly identify hazards as a result of adverse conditions is considered to be an unacceptable degradation of personnel safety by NRC.

The change resolves occasional problems with freezing of respirator exhalation valves leading to possible respirator failure and inhalation of unfiltered air, and lens fogging leading to reduced vision. The amendment has the potential for some increase in regulatory burden. For example, if licensees needed special low temperature attributes not provided by NIOSH and manufacturers, the licensees would be required to apply for approval to NRC under § 20.1703(b). While these changes may be justified on the basis of improved personnel safety

under low temperature conditions, the potential impacts are addressed in the following section.

(3) The deletion of § 20.1703(d) removes the requirement to notify the NRC region in writing 30 days before the first use of respiratory protection. Removing a requirement for duplication of reporting is expected to result in a small reduction in regulatory burden for both the NRC and some licensees, and is addressed below in the value/impact analysis.

(4) The part of Footnote g to Table 1 of Appendix A which currently precludes the use of half mask facepiece air purifying respirators for protection against plutonium or other high-toxicity materials is deleted. Half-mask respirators, if properly fitted, maintained and worn, provide adequate protection against plutonium if used within the limitations stated in the NIOSH approval and in the rule. The NRC has not identified any current technical or scientific basis for such a prohibition, and deletion may result in some reduction in regulatory burden because the change should increase operational flexibility. This is evaluated further in the value/impact analysis.

(5) The addition of single use, disposable respiratory protection devices (e.g., dust masks) to the proposed Appendix A recognizes the utility of disposables and formally permits their use with no protective credit allowed. These devices have minimal physiological impact, accommodate workers who request respirators (some States have OSHA rules which require providing respirators to workers who request them), NRC does not require fit testing or medical screening and although not quantifiable, they have been shown to provide some protection against intake. Although many of these devices cannot be tested for a measurable seal, licensees should train workers in their use and limitations. Use of such devices by persons desiring but not requiring respiratory protection (i.e., because of engineered control systems, or other factors) could result in substantial savings, and will be addressed further in the value/impact analysis.

(6) Permitting the use of "Reusable-Disposable" half-mask facepiece respirators, represents an acknowledgment of new developments in half-mask respiratory devices. This change permits increased use of these devices by licensees, and less use of more expensive respiratory protection by licensees. Reusable, reusable-disposable, or maintenance-free respiratory devices for use with radioactive material are relatively new variations on half-mask facepiece respirators. In these devices, the filter medium is an integral part of the facepiece and is not replaceable. The face-to-facepiece seal area is generally enhanced by the application of plastic or rubber. The devices have at least two adjustable suspension straps. These devices are acceptable to the NRC and are considered half masks as long as the following criteria are met: they are made of high efficiency filter media, they can be fit tested, and a fit check can be properly performed by the wearer upon donning. Since, under the proposed rule, these devices can replace more expensive respirators (primarily full facepiece respirators) their use has the potential for reducing the cost of the licensee's respiratory protection program. The use of such devices is addressed further in the value/impact analysis.

(7) The revision of Appendix A APF from 50 to 100 for air purifying, full face masks operating in negative pressure mode is consistent with ANSI Z88.2-1992 recommendations, and may result in increased flexibility (and reduced regulatory burden) for some licensees. This is addressed further in the value/impact analysis.

(8) Permitting the use of loose-fitting facepieces operated at continuous flow or positive

pressure by NRC licensees (Appendix A) reflects ANSI Z88.2-1992 recognition of the limited effectiveness of these devices (APF = 25) but makes them available to NRC licensees for many uses. The change may result in some reduction in regulatory burden via increased flexibility, and is addressed further in the value/impact analysis.

(9) The reduction in the Appendix A APFs for half- and full-mask air-line respirators operating on continuous flow mode from 1,000 to 50, and from 2,000 to 1,000, respectively, reflects the current ANSI Z88 recommendations, and might result in some minimal increase in regulatory burden. The potential impacts are addressed below in the regulatory value/impact analysis.

(10) Addition of half mask air-line respirators in pressure demand mode (APF = 50) to Appendix A is expected to result in a reduction in regulatory burden due to increased flexibility in devices available to licensees, and is consistent with ANSI recommendations. This is discussed further in the value/impact analysis.

(11) Reduction of the Appendix A APF for full facepiece air-line respirators operating in pressure demand mode from 2,000 to 1,000, recommended by ANSI, is not expected to result in a significant increase in regulatory burden. Field concentration seldom presents a need for an APF of 2,000, as opposed to 1,000, and licensees may still petition NRC to use higher APFs based on measurement and documentation. The potential impacts are addressed below in the regulatory value impact analysis.

(12) Addition of the loose fitting facepiece in air-line respirators in continuous flow mode with an APF = 25 in Appendix A (as recommended by ANSI Z88.2) is expected to result in some reduction in regulatory burden due to increased flexibility in devices available to licensees. This is addressed below in the regulatory value/impact analysis.

(13) Addition of air-line suits with no APF to Appendix A merely sanctions the long term use of these suits in certain radiological environments where they are used primarily for protection against contamination (air is supplied). The addition might result in some decrease in regulatory burden (due to increased flexibility) by formally making the use of these devices acceptable to NRC. This clarifies the NRC position on the use of these devices for contamination protection, and licensees would be allowed to request higher APFs (i.e., for use as respiratory protection devices as well) by demonstration. This is addressed further in the value/impact analysis.

(14) Noble gases are excluded from respiratory protection considerations in footnote e of Appendix A by inclusion of a specific statement that noble gases are not an inhalation risk, and that external (submersion) doses are the proper basis for protective action. Some licensees have improperly assigned respirators as protection against exposure to these gases. Therefore, it is possible that some impacts may result to some licensees in order to revise their procedures. This will be addressed further in the value/impact analysis.

5. Value Impact Analysis

The value (benefit) and impact (cost) of the changes are estimated in this section. These estimates represent the best estimated incremental changes relative to the current baseline. It is known from dosimetry reports that the existing respiratory protection rules as implemented

are effective in protecting licensee's employees from inhalation exposure to airborne radioactive materials, and that these rule changes constitute of respiratory protection. Although the changes marginally add to worker safety and health, there is no attempt to quantify added value or impact to employee health. Rather, the values and impacts of the changes are all related to potential saving or added cost in operating effective respirator programs at licensee sites. This analysis considers both power reactor licensees and materials licensees, and impacts and benefits of the new rules on respiratory protection programs are considered to be the same for both types of licensees. In making the estimates, the following general assumptions are made:

- There are about 250 licensees affected by the changes; 100 power reactor licensees and 150 non-power reactor licensees
- Labor cost is $145/hr for a power reactor licensee and $116/hr for other licensees
- NRC labor cost is estimated to be $70/hr
- Approximately 200,000 workers at licensee sites (primarily power reactors) are currently monitored for radiation exposure; about half of the monitored workers are exposed to a measurable dose; of those exposed to a measurable dose, about 10 percent/yr may use respirators (20,000)
- The most predominantly used respirators are the full mask negative pressure (NP) respirator, full mask positive pressure (PP) respirator or powered air-purifying respirator (PAPR), and full mask pressure demand (PD) Self Contained Breathing Apparatus (SCBA); no more than 10 percent currently use half-mask devices

These assumptions are made based on NRC data and on information obtained from industry experts on respiratory protection, licensees, and the Nuclear Energy Institute located in Washington, DC. The estimates and specific rationale used are presented below item by item following the same sequential order as the discussion in Section 4. A summary of the overall value and impact is presented at the end of this section.

(1) Elimination of Policy Statements

This change will save licensees the cost of preparing policy statements and also save NRC inspection staff from reviewing policy statements. It is assumed that about three licensees per year (one reactor licensee and two non-reactor licensees) would have prepared new policy statements in the future. Assuming that it would take 2.5 hours to prepare policy statements for a licensee, the cost saving per year would be:

($145/hr x 2.5 hr/licensee x 1 licensee) + ($116/hr x 2.5 hr/licensee x 2 licensees) ~ $1,000

Each licensee would also save the cost of an annual review of its policy statement. Assuming 0.25 hr for each review, for 250 licensees (100 reactor licensees and 150 non-reactor licensees), the annual saving would be:

($145/hr x 0.25 hr/review x 100 reviews/year) + ($116/hr x 0.25 hr/review x 150 reviews/year) = $7,975

In estimating NRC's cost saving, it is assumed that policy statements from 250 licensees would be inspected every year, at 0.1 hours per review. NRC's annual savings would be:

$70/hr x 0.1 hr/review x 250 reviews/year = $1,750/year

In addition, the three new policy statements prepared for NRC per year take NRC 0.5 hour each for review; at $70 per hour it will cost about $110/yr.

Total cost savings = $10,835/year

(2) Provision for Low-Temperature Usage

If a full-mask facepiece NP respirator is to be used for a low-temperature application, revised Regulatory Guide 8.15 recommends that the facepiece should be equipped with a nose cup. Nose cups can be purchased and installed in facepieces for about $30 each. Use of NP respirators in low temperature environment is expected to be rare at the present time; though such an application may increase if more nuclear power plants are undergoing decommissioning. It is assumed that five respirators equipped with nose cups would be required per year per licensee in areas where temperatures drop below zero degrees C (assumed about 80 percent of the total). In addition to equipment cost, the affected workers need to be trained to install and use the nose cup. Assuming 0.2 hr would be needed for training, the additional annual training for 100 x 0.8 = 80 reactor licensees would cost:

$145/hr x 80 licensees/year x 0.2 hr/licensee = $2,320/year

Similarly, if an equal number of non-reactor licensees required such training, the costs would also be:

$116/hr x 80 licensees/year x 0.2 hr/licensee = $1,856/year

Therefore, the total training cost will be $4,176/year.

Annualized cost of equipment for all the reactor licensees is estimated at (assuming 5-year depreciation):

$6/nose cup x 5 nose cups/reactor-year x 80 reactors= $2,400/year

Total cost of training and equipment would be: $6,576/year.

(3) Deletion of Requirement for First Time Notification of Respirator Usage

This change could result in cost savings for a few licensees and the NRC. For most current licensees, these notifications have already been made. However, to permit potential new licensees or decontamination and decommissioning efforts that would require respirator use to begin in the future, it was assumed that two licensees per year (one reactor and one non-reactor licensee) would prepare notifications at 0.5 hour per notification, the annual cost

savings would be:

($145/hr x 1 licensee/year x 0.5 hr/licensee) + ($116/hr x 1 licensee/year x 0.5 hr/licensee) = $130.5/year

For NRC, the cost of reviewing two notifications would be saved. Assuming that 0.2 hour is required for each review, the annual cost savings would be:

$70/hr x 0.2 hr/licensee x 2 licensees/year = $28/year

Because this notification was intended to trigger an NRC inspection, these costs are also avoided. Assuming 2.5 hours per inspection, the savings would be:

$70/hr x 2.5 hr/licensee x 2 licensees/year = $350/year

Total savings would be about $508/year.

(4) Removing the Prohibition of Using Half-Mask NP Respirators for Protection Against Plutonium and Other Highly Toxic Radioactive Materials

NRC licensees, and particularly reactor licensees, do not normally handle plutonium and other highly toxic radioactive materials. When plutonium is handled, it is routinely done inside airtight glove box enclosures. In either case, the likelihood of exposure to airborne plutonium is very low. Respirators may be placed in the work area for contingency use. Allowing half-mask NP respirator use under such circumstance is not expected to result in any measurable cost savings, but may increase operational flexibility, and provides additional worker protection in the event of an unexpected release from confinement. Additional savings could result from the use of reusable/disposable respirators instead of half-mask respirators, and these uses are considered in section 7 for the major users of these traditional devices (power reactors). Savings in non-reactor facilities would not be expected to increase the cost savings calculated for power reactors substantially, because relatively few respirators are used in non-reactor facilities. However, savings could be in the range of several thousand dollars per year.

(5) Acknowledging the Use of Disposable Dust Masks with no APF

This change will formally acknowledge the utility of providing disposable dust masks to employees who request such equipment in the workplace where respiratory protection against airborne radioactive material may not be needed based on ALARA considerations. This practice would be consistent with state/OSHA requirements for providing respirators to workers when they request them. Under the current rule, if an employee (e.g., maintenance or operations worker) asks for a respirator where one is not needed, a half-mask (APF = 10) or full face-piece (APF = 50) NP respirator may be the minimum available under an NRC-approved respiratory protection program.

The current rule requires a medical exam and fit testing before the use of any respirator. If a disposable respirator is provided under the proposed rule, the employee would not need a medical examination or fit test. Permitting the use of a disposable mask without all of the requirements of an approved respirator program, such as medical examinations and fit tests, could save substantial costs to licensees (especially power reactor licensees) with no reduction

in worker safety.

Respirator programs currently cost about $245 per employee per year for a reactor licensee and $216 per employee per year for a non-reactor licensee (assuming 1 hour of training and fit testing plus $100 for medical examination). Because almost all respirator use among NRC licensees are for reactor operations, non-reactor licensees can be ignored in the approximation. This does not include the costs for respirators, replacement due to wear and tear, replacement of filters, or cleaning and maintenance.

Currently, it is estimated that there are about 1,000 respirator uses/reactor-year, primarily during maintenance and refueling, or about 100,000 uses per year in the U.S. This number has probably gone down considerably, but data on the change is not available. It is assumed that about 90 percent of all respirators with APFs greater than 1.0 are full-face piece respirators (APF = 50), with the remaining 10 percent, half-face mask respirators (APF = 10). It is further estimated that of all these applications, only about 10 percent require (based on ALARA considerations) use of respirators with APFs greater than one (but less than 10), while the remaining 90 percent of uses could be satisfied by a disposable respirator (no allowed protection factor). Therefore, under new rule, about 90,000 traditional respirator uses could be replaced by disposables each year. Assuming 40 percent of all half or full facepiece respirator uses would be replaced by disposable respirators (40,000 per year, averaged over several years), the new rule would replace about 40,000 traditional respirator uses each year. Assuming the current industry maintains on the order of 500 respirators at each plant (50,000 respirators) which are used about 100,000 times per year, there would be about two uses per respirator per year.

Because of radiation protection concerns about contaminating the inside of respirators when they are removed after wear in contaminated environments, and worker's fears of breathing cold bacteria, or flu or AIDS viruses from used filters (some expired air will always exit through the filters and sneezing could spray a mist on them), industry generally uses each respirator only once before it is recycled for cleaning and filter replacement.

Further, assuming full face-piece and half-mask respirators last from 5 - 10 years (7.5 years on average) before being replaced, licensees would replace 50,000 respirators/7.5 years = 6,670 respirators per year. If these respirators were replaced by traditional respirators, the cost for half-mask ($25 each) and full-face mask ($150 each) respirators would be:

[($25 x 0.1) + ($150 x 0.9)] x 6,670 = $917,125/year

The cost of replacing these traditional devices by disposable masks would be:

0.4 x 100,000 masks/yr x $0.8/mask = $32,000/year
(i.e., the net savings would be about $885,125/year)

Assuming each worker uses a respirator two times per year, about 20,000 workers x 0.4 = 8,000 workers would be using disposable masks each year for the first time under the new rule. Assuming training on use of the new disposable respirators takes 0.2 hours/worker, the training costs would be:

$145/worker-hr x 0.2 hour x 8,000 workers/year = $232,000/year

For traditional respirator uses, if 5 percent of the work force is replaced each year, there would be about 1,000 new workers to train each year. Under the current regulations, that training cost would be:

$145/worker x 0.2 hours 1,000 workers = $29,000/year

Maintenance costs for disposable masks would be zero. However, the maintenance costs for traditional respirators would be substantial for the 40,000 uses each year which could be avoided by using disposable masks. Assuming only 5 minutes per mask for cleaning and replacement of the filter(s) and bagging, the costs would be:

40,000 uses/year x 5/60 hr/use x $145/hr = $483,300/year

The cost of replacing the filter(s) on traditional masks would be:

40,000 uses/year x $7/use = $280,000/year

Thus, the total cost for traditional respirators would be about $1.7 million/year

New procedures would only be required if disposable masks were to be used, the cost for all operating reactors, assuming 2 hours of preparation per plant, would be:

2 hrs/plant x 100 plants x $145/hr = $29,000 **the first year only**
(or $6,000/year over a period of 5 years)

Cost Savings From Permitting Use of Disposables

Cost of Using Traditional Masks		Cost of Change to Disposables	
Replacing worn-out or damaged half or full-face respirators	917K	Cost of disposables	32K
Training new users of traditional masks	29K	Training on use of new disposables	232K
Respirator Maintenance	480K	Cost of writing new procedures	6K
Filter Replacement	280K		
Total	1706K	Total	270K

Thus the potential savings from permitting the use of disposables is about $1,436K.

(6) Permitting the Use of "Reusable-Disposable" Half-mask Facepiece Respirators

At the present time, essentially no power reactor licensees are using half–mask respirators in the NP mode (APF = 10). Current NRC guidance discourages the use of such devices as part of licensed activities because they must be checked for fit with irritant smoke each time they are put on. Thus, licensees typically use a more expensive full facepiece respirator in the NP mode

with an APF = 50, because they are not required to perform irritant smoke tests each time those devices are donned. Under the new rule change that requirement would be removed for half-masks, and licensees would have an opportunity to replace current full facepiece respirators with half-mask disposable or reusable-disposable respirators.

One of the newest types of half-face mask devices approved by NIOSH is the "reusable-disposable" half-mask respirator. These devices are substantially less costly than current half- or full-face masks and do not require any maintenance program, since they are simply discarded when wearers have completed their work. Thus, while less costly to purchase and maintain than full face-mask devices, the costs of new reusable-disposable facepiece respirators would mount up quickly under periods of heavy use. Thus, the value must be compared with the lifetime cost per use of the respiratory devices they might replace. Because the use of these half-mask respirators would require training and procedures comparable to current respirators, there are no expected cost reductions associated with their use except the initial purchase costs relative to the cost of maintaining and replacing worn-out half and full-face respirators. Because these respiratory devices will not be useful for as long as current more expensive full-or half-mask facepiece respirators (with an accepted maintenance program), the cost of replacing some part of the currently used, more costly facepieces should also be considered in the cost analysis for the proposed rule.

It is assumed that about 10 percent of all traditional respirators in use are half-mask devices with an APF = 10; that means that about 0.1 x 50,000 = 5,000 of these devices might be used per year. If, as above, they are used about 20 times per year, cost $25 each, and last about 7.5 years on average, replacement costs are about:

$25/mask / 7.5 year x 5,000 uses/year = $16,650/year

Cleaning costs for these traditional respirators, using the same assumptions as in 6) above, would be:

5,000 uses/year x 5/60 hr/use x $145/hr = $60,417/year

Filter replacement costs at about $7 per mask would be about:

5,000 uses/year x $7/use = $35,000/year

The cost of reusable/disposable respirators is on the order of $7 (or less) each. It is assumed that they would also be used only once before disposal for each time an APF greater than one is required. Thus, annual costs of using these devices in place of traditional respirators would be:

5,000 uses/year x $7/device = $35,000/year

Cost Savings For Permitting Use of Reusable-Disposable Masks

Cost of Using Traditional Masks		Cost of Change to Disposables	
Replacement Cost of traditional masks	16.6K	Cost of Disposables	35K
Maintenance/cleaning	60.4K		
Filter replacement	35K		
Total	112K	Total	35K

Thus the potential annual cost savings from permitting the use of reusable-disposable half-masks is about 77K.

(7) Increasing APF from 50 to 100 for Full Mask NP Respirators

With the current rule, a full face PP respirator (PAPR or airline respirator) is needed to provide a protection factor greater than 50. By crediting a full mask NP respirator with an APF of 100, in theory, the more costly PAPR can be replaced by NP full face respirator. However, the practice among licensees is that PAPRs are provided for situations where a protection factor of 50 or more is needed. In other words, a licensee already has a stock of PAPRs that will provide assigned protection factors of up to 1,000 and the PAPRs are likely to be used in preference to full mask NP respirator. As such, no material benefit is expected from this change.

(8) Permitting the Use of Loose-fitting PAPRs with APFs of 25.

ANSI created this new category of devices to accommodate this less protective type of PAPR. The APF was downgraded from 1,000 (which it remains for FF and hood-type PAPRs). Since these devices are already being used in the nuclear industry, there is no expected impact on worker safety and licensee burden, and little opportunity for significant savings. This change simply recognizes this application and formally permits licensees more choices in selecting proper respiratory equipment for exposure situations where a protection factor of no greater than 25 is needed to safely perform the work.

(9) Reducing the APF from 1,000 to 50 for Half-Mask CF Air-line Respirators and Reducing the APF from 2,000 to 1,000 for Full-Mask CF Air-line Respirators

Reducing the APF from 1,000 to 50 for a half-mask CF air-line respirator would require the use of a full-mask to achieve an APF of 1,000 (if oxygen deficiency is not a problem in the work area). Because almost all licensees already have full masks in stock, this change is not expected to increase licensee costs of operation. If oxygen deficiency is a problem, a SCBA would have to be used. Again, since licensees are likely to have SCBAs in stock, there should be little cost impact to licensees.

(10) Adding Half-Mask PD Air-line Respirators with an APF of 50

This addition will provide flexibility in selecting respirators for situations where a protection factor of no greater than 50 is needed and where oxygen deficiency (but not IDLH) is a

problem. Cost savings as a result of this additional respirator are negligible since under the current rule there is no specific air-line respirator that will provide a protection factor of up to 50. In most cases, licensees would already have air-line respirators with an APF of 1,000 in stock anyway.

(11) Reducing the APF from 2,000 to 1,000 for Full-Mask PD Air-line Respirators

This change is made pursuant to ANSI recommendations and is intended to simplify the APF System. An assigned protection factor of 2,000 is unlikely to be needed (typical concentrations of radioactivity in the field are far less than 1,000 times the DACs). A licensee can still apply for a higher APF when situations and data warrant. Because this change does not change the current practice in respiratory protection among licensees, no significant value/impact is expected.

(12) Addition of Loose-Fitting CF Air-line Respirators with an APF of 25

The addition will increase a licensee's flexibility in selecting respirators for a protection factor of no greater than 25, where oxygen deficiency (but not IDLH) is a problem. Because no currently allowed air-line respirator is specifically designed to meet this situation, a licensee would have to use an air-line respirator with an APF of 1,000 under the current rule. The addition is not likely to change licensee practice in the immediate future and no significant value/impact is expected.

(13) Addition of Air-line Suit with no APF

This addition formally sanctions the use of air-line suits with no credit for inhalation exposure reduction (i.e., for protection against contamination only). This has been in practice for years without any reported problems. Simply making the existing unsanctioned practice acceptable should add no measurable impact or value to a licensee. However, because the change also allows licensees to request approval for higher APFs where they can be demonstrated, this change may provide more operational flexibility.

(14) Exclusion of Noble Gases from Respiratory Protection Considerations

This change is intended to avoid confusion on the part of licensees as to the requirements of Subpart H related to protection against noble gases. It is assumed that perhaps 5 percent of NRC power reactor licensees will be required to modify their procedures to exclude noble gases from respiratory protection considerations (i.e., about five licensees). If the revision requires 1 hour per licensee, the cost over the remaining life of their facility (assume 10 years) would be:

$145/hr x 1 hr/licensee x 5 licensees/10 years = $73/year

A summary of the estimated annual value and impact for each major change is presented below. Total annual increase in value is estimated to be $1,829,483 while the total added cost is estimated at $311,576 for net annual savings of $1,517,907.

6. Decision Rationale

1. All of the alternatives are acceptable according to generally accepted radiation protection principles expressed by NRC, NCRP, and ICRP.

2. Compared to practice under the current Part 20, Subpart H, each proposed change either involves no change in value/impact, or represents an improvement in regulatory protection of worker health and safety without any significant added costs (i.e., all value), or presents the potential for reductions in regulatory burden and/or increased operational flexibility with net savings to licensees and the NRC.

3. Many of the proposed changes only clarify existing requirements (i.e., reduce the potential for licensee misunderstandings) or formally adopt the current ANSI standard Z88-1992 (with a few exceptions) to which most licensees already comply.

	PROPOSED CHANGE	**VALUE** (per year)	**IMPACT** (per year)
1.	Eliminating Policy Statement	$10,835	$0
2.	Provision for low temperature use	0	6,576
3.	Eliminating first time notification requirement	508	0
4.	Allowing half-mask for plutonium use	0	0
5.	Disposable mask with no APF	1,706,000	270,000
6.	Reusable-Disposable mask with APF = 10	112,067	35,000
7.	Increasing APF, 50 to 100. Full mask NP	0	0
8.	Loose fitting PAPR with APF = 25	0	0
9.	Reducing APF, 1,000 to 50. Half-mask Air-line CF; Reducing APF, 2,000 to 1,000. Full-mask Air-line CF	0	0
10.	Half-mask Air-line PD. APF = 50	0	0
11.	Reducing APF, 2,000 to 1,000. Full mask Air-line PD	0	0
12.	Loose fitting Air-line. APF = 25	0	0
13.	Air-line suits. No APF	0	0
14.	Exclusion of Noble Gases from Subpart H	73	0
	TOTAL VALUE/IMPACT	1,829,483	311,576