

**Instructions:**

1. Appendix contains tables for the NCEL section of the Order.
  - a. **Copy** the appropriate complete respirator table from Appendix.
  - b. **Paste** the respirator table in the NCEL section (a Note to Program Managers shows you where).
  - c. **Delete** the remainder of the Appendix.
2. Add Attachment C (below; “Statistical Analysis of NCELS Analytical Method Verification Results”) to the Table of Contents and paste Attachment C to the end of the Order.
3. Insert the following NCEL section (including the appropriate respirator table) after “Protection in the Workplace”:

**NEW CHEMICAL EXPOSURE LIMIT**

(a) Alternative to Requirements of Respirator Section.

(1) EPA recommends and encourages the use of pollution prevention, source reduction, engineering controls and work practices, rather than respirators, as a means of controlling inhalation exposures whenever practicable.

(2) Whenever a person is reasonably likely to be exposed to the PMN substance by inhalation, as an alternative to compliance with the respirator requirements in the Protection in the Workplace section of this Order, the Company may comply with the requirements of this New Chemical Exposure Limit section. However, before the Company may deviate from the respirator requirements in the Protection in the Workplace section of this Order, the Company must:

(i) submit to EPA a copy of the Company’s sampling and analytical method for the PMN substance, verified in accordance with subsection (c)(3) of this New Chemical Exposure Limit section;

(ii) obtain exposure monitoring results in accordance with this New Chemical Exposure Limit section; and,

(iii) based on those exposure monitoring results, select, provide, and ensure use if necessary of the appropriate respiratory protection specified in paragraph (e)(2) of this New Chemical Exposure Limit section by persons who are reasonably likely to be exposed to the PMN substance by inhalation.

(3) After appropriate respiratory protection has been selected at a workplace based on the results of actual exposure monitoring conducted in accordance with this New Chemical Exposure Limit section, the Company must not, at that workplace, use the respiratory protection required in the Protection in the Workplace section of this Order unless it is the same as required by this New Chemical Exposure Limit section.

(b) Exposure Limit.

(1) General. The following new chemical exposure limit (“NCEL”) for the PMN substance is an interim level determined by EPA based on the limited information available to the Agency at the time of development of this Order. The NCEL for the PMN substance is as follows:

(i) Time-Weighted Average (“TWA”) Limit. The Company must ensure that no person is exposed to an airborne concentration of the PMN substance in excess of \_\_\_\_\_ (the NCEL) as an 8-hour time-weighted average, without using a respirator in accordance with subsection (e) of this New Chemical Exposure Limit section.

(ii) Non-8-Hour Work-shifts. For non-8-hour work-shifts, the NCEL for that work-shift (NCEL<sub>n</sub>) must be determined by the following equation:  $NCEL_n = NCEL \times (8/n) \times [(24-n)/16]$ , where n = the number of hours in the actual work-shift.

(iii) Short-Term Exposure Limit (“STEL”). The Company must ensure that no person is exposed to an airborne concentration of the PMN substance in excess of \_\_\_\_\_ as averaged over any 15 minute period, without using a respirator in accordance with subsection (e) of this New Chemical Exposure Limit section. **[Note to Program Managers: Delete this paragraph if there is no STEL.]**

(2) Automatic Sunset. If, subsequent to the effective date of this Order, OSHA promulgates, pursuant to §6 of the Occupational Safety and Health Act, 29 U.S.C. 655, a final chemical-specific permissible exposure limit (“PEL”) specifically applicable to this PMN substance and the OSHA PEL is not challenged in court within 60 days of its promulgation, then any respirator requirements in the Protection in the Workplace section of this Order and any requirements of this New Chemical Exposure Limit section applicable to workers and situations subject to the OSHA PEL will automatically become null and void. However, the requirements of this Consent Order are not negated by any pre-existing OSHA PEL applicable to the PMN substance.

(c) Performance-Criteria for Sampling and Analytical Method.

(1) Applicability. For initial development and validation of the sampling and analytical method for the PMN substance, all the requirements of this subsection (c) apply. For subsequent exposure monitoring conducted pursuant to subsection (d) of this New Chemical Exposure Limit section, only the following requirements apply: (c)(4)(i), (4)(ii), (4)(iv)(II), (4)(v)(II), (8), and (9). Any deviation from the requirements of this subsection (c) must be approved in writing by EPA.

(2) Submission of Verified Method and Certification Statement. The Company must submit to EPA a copy of a validated sampling and analytical method for the PMN substance

which satisfies the criteria specified in this subsection (c). The method description must expressly state how the method compares with each quantitative requirement specified in this subsection (c). The submission must include a written statement, signed by authorized officials of both the Company and the Laboratory, certifying the truth and accuracy of the independent laboratory verification conducted pursuant to subsection (c)(3). To assist EPA in identifying the document, it must state in a conspicuous, underlined subject-line at the top of the first page: “NCEL Sampling and Analytical Method for PMN #\_\_\_\_\_,” after which the correct PMN number for this chemical substance must be stated.

(3) Verification of Analytical Method by Independent Third-Party Laboratory.

(i) Verification. The Company must have an independent reference laboratory (“Laboratory”) verify the validity of the analytical method for the PMN substance, in accordance with the other requirements in this subsection (c)(3). It is the Company’s responsibility to ensure that the Laboratory complies with all the requirements specified in this subsection (c)(3).

(ii) Independent Reference Laboratory. The independent reference laboratory must be a separate and distinct person (as defined at 40 CFR 720.3(x)) from the Company and from any other person who may have developed the method for the Company.

(iii) Accreditation. The Laboratory must be accredited by a formally recognized government or private laboratory accreditation program for chemical testing and/or analysis.

(iv) Good Laboratory Practice Standards. The Laboratory verification of the analytical method for the PMN substance must comply with TSCA Good Laboratory Practice Standards (“GLPS”) at 40 CFR Part 792. (Certain provisions of the TSCA GLPS applicable to toxicity testing in laboratory animals, such as 40 CFR 792.43 (“Test system care facilities”), 792.45 (“Test system supply facilities”) and 792.90 (“Animal and other test system care”), are

clearly inapplicable to the NCEL requirements.) However, compliance with TSCA GLPS is not required under this New Chemical Exposure Limit section where the analytical method is verified by a laboratory accredited by either: (A) the American Industrial Hygiene Association (“AIHA”) Industrial Hygiene Laboratory Accreditation Program (“IHLAP”); or (B) another comparable program approved in advance in writing by EPA.

(v) Analysis of Duplicate Samples. The Company must collect six duplicate samples (a total of 12) at the TWA concentration. The samples must be taken either from a controlled environment (e.g., a sealed chamber or “glove box”) which closely resembles the actual workplace conditions or, for solids and liquids with very low vapor pressure, by injecting the PMN substance onto a sample collection device. The duplicate samples must be collected on identical collection media, at the same time, and under the same conditions. One set of six samples must immediately be analyzed by the Company, the other set of six samples must be analyzed by the Laboratory using the method developed by or for the Company.

(vi) Sample Storage Study. If the results of the analysis of duplicate samples pursuant to paragraph (c)(3)(v) do not satisfy the requirements in paragraph (c)(3)(vii), the Company must perform a sample storage study as follows:

(I) Triplicate Samples. The Company must collect six triplicate samples (a total of 18) at the TWA concentration. The samples must be taken either from a controlled environment (e.g., a sealed chamber or “glove box”) which closely resembles the actual workplace conditions or, for solids and liquids with very low vapor pressure, by injecting the PMN substance onto a sample collection device. The triplicate samples must be collected on identical collection media, at the same time, and under the same conditions. One set of six samples must immediately be analyzed by the Company.

(II) Analysis After Sample Storage. A sample storage evaluation must be performed with the two remaining sets of six samples. One set of six samples must be analyzed by the Laboratory using the method developed by or for the Company, and the other must be analyzed by the Company on the same day as the Laboratory analyzes its six samples. Specialized storage conditions for the samples including extraction conditions, time from sampling to extraction, time from collection or extraction (if applicable) to analysis and storage conditions must be specified in the method description.

(vii) Comparison of Results. The difference between the results of the two sets of six samples analyzed by the Laboratory and the Company as required in either paragraph (c)(3)(v) or (c)(3)(vi)(II) must be evaluated using a two-sample t-test with unequal variances, and the two sides of the critical regions must not exceed a 5% significance level. (See Attachment C - Statistical Analysis of NCELS Analytical Method Verification Results.) The average of each set of six samples must be within 10% of the true value. If the average of each set of six samples is not within 10% of the true value, then the sample storage time between collection and analysis must be reduced until the average of each set of six samples is within 10% of the true value.

(4) Accuracy. The sampling and analytical method must clearly demonstrate the following:

(i) General. The sampling and analytical method, and all exposure monitoring data relied on by the Company, must be accurate to within  $\pm 25\%$  at a 95% confidence level for concentrations of the PMN substance ranging from one half the NCEL to twice the NCEL.

(ii) NCEL Quantitation Limits. The analytical method should be capable of reliably quantifying the PMN substance across the full range of reasonably likely exposures. At a minimum, the analytical method must be capable of reliably quantifying from a lower quantitation

limit (“LQL”) of one half the NCEL to an upper quantitation limit (“UQL”) of at least twice the NCEL. If the Company obtains an exposure monitoring sample that is more than 10% above the actual UQL of the analytical method, the Company must comply with paragraph (e)(4)(i).

(iii) Lower Quantitation Limit Signal-To-Noise Ratio. The analytical method must be capable of quantifying the PMN to a concentration of one half the NCEL with a signal that is at least five times the baseline noise level. Baseline noise must be amplified to a measurable level when possible, even if the required amplification is beyond that used in routine analysis of samples. (If baseline noise cannot be obtained, another reference must be selected. This may be a peak considered to be noise caused by the reagent matrix.) The sampling preparation method must be specified and the detection limit for the analytical procedure must be reported as mass per injection for chromatographic techniques.

(iv) Instrument Calibration.

(I) Initial Calibration. For method development and validation (but not subsequent exposure monitoring), the initial calibration must at a minimum consist of five (5) calibration standards with a linear correlation of 0.95 -- these five (5) calibration standards must consist of one standard at each of the following concentrations: one half the NCEL ( $0.5 \times \text{NCEL}$ ); between one half and one times the NCEL ( $>0.5 \times \text{NCEL}, < 1 \times \text{NCEL}$ ); one times the NCEL ( $1 \times \text{NCEL}$ ); between one and two times the NCEL ( $>1 \times \text{NCEL}, < 2 \times \text{NCEL}$ ), and twice the NCEL ( $2 \times \text{NCEL}$ ).

(II) Continuing Calibration. During each week of both method development/validation and subsequent exposure monitoring, the Company must conduct both an initial instrument calibration and a continuing calibration. The Company must perform at least one continuing calibration sample at the NCEL concentration, and at least one additional

calibration sample per every 10 samples analyzed. The continuing calibration sample must fall within  $\pm 25\%$  of the initial calibration value. If not, then the initial calibration must be repeated, and any samples associated with that outlying calibration check must be re-analyzed.

(v) Calculated Percent Recovery.

(I) Initial Calculation. For method development and validation, the Company must calculate the percent of the PMN substance recovered by the analytical method from a sample containing a known quantity of the PMN substance. The sample must be taken either from a controlled environment (e.g., a sealed chamber or “glove box”) which closely resembles the actual workplace conditions or, for solids and liquids with very low vapor pressure, by injecting the PMN substance onto a sample collection device. (Such a sample is referred to as a “matrix spike”). The calculated percent recovery for each matrix spike must be greater than or equal to 75% and less than or equal to 125%. Spike concentrations for the PMN substance must be included in the sampling and analytical method submitted to EPA.

(II) Subsequent Calculation. During each subsequent exposure monitoring episode or campaign, at least 1 matrix spike, prepared by injecting the PMN substance onto a sample collection device, must be analyzed. (This matrix spike must be prepared at the NCEL concentration.)

(vi) Sampling Device Capacity. The capacity of the sampling device must be tested and results reported to show under a known and well-defined set of conditions that the device is capable of collecting the new chemical in solid, liquid or vapor phase with minimal loss. The sampling device’s capacity (air volume and collected analyte mass) must be specified. For methods that use adsorbent tubes as the collection medium, evidence of the capacity must be provided in the form of breakthrough testing. This testing must be done at a concentration twice

the NCEL and under conditions similar to those expected in the workplace. Breakthrough is defined to have occurred when the concentration of the PMN substance in the effluent stream is equal to 5% of the concentration of the influent stream, or when 20% of the PMN substance is detected in the backup section of the sampler.

(vii) Sampling Device Desorption Efficiency. Where applicable, the desorption efficiency must be evaluated for the air sampling device. A minimum of six air samples spiked with the PMN substance at least the NCEL concentration must be prepared. A recovery of at least 75% must be obtained for each of the six samples.

(5) Precision. The estimate of the coefficient of variation of each set of six samples from the controlled atmosphere test (spiked at 1.0 NCEL, per paragraphs (c)(3)(v) or (vi)) must be less than 0.105, including allowance of 0.05 for error due to sampling.

(6) Interpretation of Accuracy and Precision Data.

(i) If a single matrix spike recovery is less than 75% recovery or greater than 125% or the estimated precision is greater than 0.105, then the Company must re-prepare the matrix spike, re-sample, and re-analyze all samples associated with such matrix spike or triplicate samples.

(ii) For percent recoveries less than 90% but greater than 75%, correction for low recovery is required. Correct for recovery first by dividing the observed amount by the proportion recovered before determining if measurements fall below the NCEL. For example, if the observed level is  $30 \text{ mg/m}^3$  and the percent recovery is 75%, use the value  $30 \text{ mg/m}^3 / (0.75) = 40 \text{ mg/m}^3$  when determining whether the levels are below the exposure limit.

(7) Representativeness. All sample conditions used to develop the methodology must mimic the actual workplace environment expected to be monitored. Conditions such as the

temperature, humidity, lighting, and presence of other chemicals, etc. must mimic the conditions in the workplace to be monitored.

(8) Changes Affecting Validity. If the workplace environment changes from the initial conditions described in the verified sampling and analytical method in a way reasonably likely to invalidate the accuracy of the method, then the Company must comply with the respirator requirements in the Protection in the Workplace section of this Order, unless the Company re-validates the method to confirm that the requirements for accuracy and precision in paragraphs (c)(4) and (5) are met. Examples of possible changes include but are not limited to: introduction of a new chemical substance to the workplace which may interfere with the analysis of the new chemical; introduction of light to the workplace which may interfere with a light-sensitive PMN substance; or introduction of water/increased humidity to the workplace which could react with the PMN substance and cause difficulties in collection and analysis.

(9) Comparability. All data and results must be reported in the same units of measurement as the NCEL.

(10) Responsibility for Method Validity. The independent laboratory verification and EPA receipt of the sampling and analytical method pursuant to this subsection (c) do not ensure that the method will produce valid exposure monitoring data. The Company is ultimately responsible for ensuring the validity of its exposure monitoring data.

(d) Monitoring Potential Exposure.

(1) General.

(i) Action Level. The “action level” is defined as an airborne concentration of the PMN substance, calculated as an 8-hour time-weighted average, equal to one half the NCEL TWA

specified in subparagraph (b)(1). For non-8-hour work shifts, the action level is equal to one half the NCEL<sub>n</sub>. (The NCEL<sub>n</sub> is described in subparagraph (b)(1)(ii).) The Company may exceed the action level without penalty. The purpose of the action level is solely to determine the requisite monitoring frequency.

(ii) Representative Exposure Groups. Whenever exposure monitoring is required by this New Chemical Exposure Limit section, the Company must take representative samples of what the potential exposure of each person who is reasonably likely to be exposed to airborne concentrations of the PMN substance would be if respirators were not worn. The Company must do so by sampling the breathing zone air of at least one person that represents, and does not underestimate, the potential exposure of every person performing the same or substantially similar operations in each work shift, in each job classification, in each work area (hereinafter identified as an “exposure group”) where inhalation exposure to the PMN substance is reasonably likely to occur. The exposure of each person need not be itself directly sampled if that exposure is represented by sampling the exposure of another person in the same exposure group.

(iii) Good Laboratory Practice Standards. Determinations of potential inhalation exposure must be made according to TSCA Good Laboratory Practice Standards at 40 CFR Part 792 and the sampling and analytical method developed pursuant to subsection (c) of this New Chemical Exposure Limit section. (Certain provisions of the TSCA GLPS applicable to toxicity testing in laboratory animals, such as 40 CFR 792.43 (“Test system care facilities”), 792.45 (“Test system supply facilities”) and 792.90 (“Animal and other test system care”), are clearly inapplicable to the NCEL requirements.) However, compliance with TSCA GLPS is not required where exposure monitoring samples are analyzed by a laboratory accredited by either: (A) the AIHA IHLAP; or (B) another comparable program approved in advance in writing by EPA.

(iv) Full Shift Exposure Samples. Representative 8-hour TWA airborne concentrations must be determined on the basis of samples representing the full shift exposure for each exposure group.

(v) STEL Samples. Determinations of compliance with the STEL must be made from 15 minute breathing zone samples measured at operations where there is reason to believe that the maximum short-term exposures will occur, such as during, but not limited to, the following operations: \_\_\_\_\_. **[Note to Program Managers: Delete this paragraph if there is no STEL.]**

(2) Initial Monitoring. Before the Company may deviate from the respirator requirements of the Protection in the Workplace section, the Company must conduct initial exposure monitoring to accurately determine the airborne concentration of the PMN substance for each exposure group in which persons are reasonably likely to be exposed to the PMN substance.

(3) Periodic Monitoring.

(i) If any representative samples taken during the initial exposure monitoring reveal an airborne concentration at or above the action level but at or below the TWA, the Company must repeat the exposure monitoring for that exposure group at least every 6 months. If the PMN substance is not manufactured, processed, or used at all during a given 6 month calendar period, the Company is not required to conduct exposure monitoring until manufacture, processing, or use of the PMN substance is resumed. However, cessation of manufacturing, processing and use of the PMN substance for less than the 6 month period does not constitute grounds for postponement of the 6 month deadline to conduct exposure monitoring.

(ii) If any representative samples taken during the initial exposure monitoring reveal an airborne concentration above the TWA, the Company must repeat the exposure

monitoring for that exposure group at least every 3 months. If the PMN substance is not manufactured, processed, or used at all during a given 3 month calendar period, the Company is not required to conduct exposure monitoring until manufacture, processing, or use of the PMN substance is resumed. However, cessation of manufacturing, processing and use of the PMN substance for less than the 3 month period does not constitute grounds for postponement of the 3 month deadline to conduct exposure monitoring.

(iii) The Company may alter the exposure monitoring schedule from every 3 months to every 6 months for any exposure group for whom two consecutive measurements taken at least 7 days apart indicate that the potential exposure has decreased to the TWA or below, but is at or above the action level. Where the PMN substance is manufactured, processed, or used in batches of duration less than 7 days, the 2 consecutive measurements may be taken at least 24 hours apart, provided that the measurements accurately reflect the highest peak exposures and variability in exposure.

(4) Termination of Monitoring.

(i) If representative samples taken during the initial exposure monitoring reveal an airborne concentration below the action level, the Company may discontinue monitoring for that exposure group, except when additional exposure monitoring is required by paragraph (d)(5) of this New Chemical Exposure Limit section.

(ii) If representative samples taken during the periodic monitoring reveal that an airborne concentration, as indicated by at least 2 consecutive measurements taken at least 7 days apart, are below the action level, the Company may discontinue the monitoring for that exposure group, except when additional monitoring is required by paragraph (d)(5) of this New Chemical Exposure Limit section. Where the PMN substance is manufactured, processed, or used in batches

of duration less than 7 days, the 2 consecutive measurements may be taken at least 24 hours apart, provided that the measurements accurately reflect the highest peak exposures and variability in exposure.

(5) Additional Monitoring.

(i) For a previously monitored exposure group, the Company must, within 7 days of any of the events listed below in this paragraph (d)(5)(i), conduct the initial exposure monitoring followed by any periodic or additional exposure monitoring required by subsection (d) of this New Chemical Exposure Limit section:

(I) change in the production volume, process, control equipment, personnel or work practices that may reasonably cause new or additional exposures to the PMN substance;

(II) spills, leaks, ruptures or other breakdowns occur that may reasonably cause new or additional exposures to the PMN substance; and

(III) whenever else the Company has any reason to suspect a change that may reasonably result in new or additional exposures to the PMN substance.

(ii) In no event is the additional exposure monitoring requirement in paragraph (d)(5)(i) intended to delay implementation of any necessary cleanup or other remedial action. During any cleanup or remedial operations that may occur before commencing additional exposure monitoring, the Company must ensure that potentially exposed persons use at least the respiratory protection specified in subsection (e) for the measured airborne concentration, or more protective respiratory equipment deemed appropriate by the best professional judgment of a qualified expert.

(6) Notification of Monitoring Results.

(i) Within 15 working days after receipt of the results of any exposure monitoring required by this Order, the Company must notify each person whose exposure is represented by that monitoring. The notice must identify the NCEL, the exposure monitoring results, and any corresponding respiratory protection required by subsection (e). Affected persons must be notified in writing either individually or by posting the information in an appropriate and accessible location.

(ii) Whenever the NCEL is exceeded, the written notification required by the preceding paragraph must describe the action being taken by the Company to reduce inhalation exposure to or below the NCEL, or must refer to a document available to the person which states the actions to be taken to reduce exposure.

(7) Exemption based on Objective Data. Where the Company has documented and reliable objective data demonstrating that, even under worst-case conditions, employee exposure to the PMN substance will not exceed the action level (defined in paragraph (d)(1)(i)) under the expected handling procedures and conditions for a specific “exposure group” (defined in paragraph (d)(1)(ii)), then that exposure group is exempt from this New Chemical Exposure Limit section (except paragraph (d)(5) “Additional Monitoring” and subsection (f) “NCEL Recordkeeping”) and the respirator requirements in the Protection in the Workplace section of this Order. Any such objective data must accurately characterize actual employee exposures to the PMN substance and must be obtained under conditions closely resembling the types of materials, processes, control methods, work practices, and environmental conditions in the Company’s current workplace operations with the PMN substance. Examples of objective data that may be used to demonstrate that employee exposure will not exceed the action level, even under worst

case conditions, include information on the physical and chemical properties of the PMN substance, industry-wide studies, and/or laboratory test results.

(e) Respiratory Protection.

(1) General. Whenever the Company has conducted exposure monitoring at a workplace in accordance with subsection (d) of this New Chemical Exposure Limit section and the measured airborne concentration of the PMN substance for any person who is reasonably likely to be exposed to the PMN substance by inhalation exceeds the NCEL, the Company must provide those persons the respirators specified in this subsection (e) (rather than the respirator(s) identified in the Protection in the Workplace section of this Order), and must ensure that the respirators are used (including training, fit testing, and maintenance) in accordance with OSHA and NIOSH respiratory protection requirements at 29 CFR 1910.134 and 42 CFR Part 84. When the Company has not yet measured the airborne concentration of the PMN substance at a workplace in accordance with this New Chemical Exposure Limit section, the Company must comply with the respirator requirements in the Protection in the Workplace section of this Order at that workplace.

(2) Selection of Appropriate Respiratory Protection. After the Company has conducted exposure monitoring in accordance with subsection (d) of this New Chemical Exposure Limit section, the Company must select, provide, and ensure that persons who are reasonably likely to be exposed to the PMN substance by inhalation use, at a minimum, the respiratory protection which corresponds in the following table to the measured airborne concentration (or a more protective respirator which corresponds to a concentration higher than measured).

**[Note to Program Managers: Copy the appropriate complete table from the Table of Respirators for NCEs in Appendix, and paste it here, then delete Appendix.]**

(3) Reductions in Respiratory Protection. After appropriate respiratory protection has been selected based on the results of actual exposure monitoring conducted at a workplace in accordance with subsection (d) of this New Chemical Exposure Limit section, the Company must not, at that workplace, use the respiratory protection required by the Protection in the Workplace section of this Order (unless it is the same as required by this New Chemical Exposure Limit section). Before the Company may make any reduction in any respiratory protection selected pursuant to this New Chemical Exposure Limit section, the Company must verify, by 2 consecutive measurements taken at least 7 days apart, that the new respiratory protection is appropriate in accordance with paragraph (e)(2). Where the PMN substance is manufactured, processed, or used in batches of duration less than 7 days, the 2 consecutive measurements may be taken at least 24 hours apart, provided that the measurements accurately reflect the highest peak exposures and variability in exposure.

(4) Special Situations.

(i) Measurements Outside Quantitation Limits. When a value less than the LQL of the analytical method (as described in paragraph (c)(4)(ii)) is measured, the Company must estimate potential exposure using generally established and accepted statistical methods. If the Company obtains an exposure monitoring sample that is more than 10% above the actual UQL of the analytical method, the Company must ensure that its workers wear at least a NIOSH-certified supplied-air respirator operated in pressure demand or other positive pressure mode and equipped with a tight-fitting full facepiece. Any reductions in this respiratory protection must comply with paragraph (e)(3). The Company may submit an improved analytical method provided that it complies fully with subsection (c) of this New Chemical Exposure Limit section, including the verification required by subsection (c)(3).

(ii) Cleanup and Remedial Actions. During any special cleanup or other remedial actions that may occur before commencing additional exposure monitoring (as discussed in paragraph (d)(5)(ii)), the Company must ensure that potentially exposed persons use at least the respiratory protection specified above in this subsection (e) for the measured airborne concentration, or more protective respiratory equipment deemed appropriate by the best professional judgment of a qualified expert.

(f) NCEL Recordkeeping.

(1) Whenever the Company elects to comply with this New Chemical Exposure Limit section rather than the respirator requirements in the Protection in the Workplace section of this Order, the Company must maintain the following records until 30 years after the date they are created, and must make them available for inspection and copying by EPA in accordance with section 11 of TSCA:

(i) A copy of the sampling and analytical methods used and continuing evidence of their accuracy over time as required by section (c);

(ii) Records documenting compliance with the analytical method verification requirements of subsection (c)(3), including copies of the signed certification statement and the verification results obtained by both laboratories;

(iii) Records documenting either compliance with the Good Laboratory Practice Standards at 40 CFR Part 792, or use of a laboratory accredited by the AIHA or another comparable program approved in advance in writing by EPA. Where the Company elects to not comply with TSCA GLPS, such records must include the written accreditation from the AIHA or the written approval from EPA.

(iv) Records documenting all exposure monitoring dates, duration, and results of each sample taken;

(v) Records documenting the name, address, work shift, job classification, and work area of the person monitored and of all other persons whose exposures the monitoring is intended to represent;

(vi) Any conditions that might have affected the monitoring results;

(vii) Notification of exposure monitoring results required by paragraph (d)(6);

(viii) Records documenting any changes in the production, process, control equipment, personnel or work practices that may reasonably cause new or additional exposures to the PMN substance;

(ix) Records documenting any spills, leaks, ruptures or other breakdowns that may cause new or additional exposure;

(x) The type of respiratory protective devices worn by the monitored person, if any;

(xi) Records documenting any actions taken to mitigate exposures to the PMN substance;

(xii) Records documenting reliance on the objective data exemption in paragraph (d)(7), including: (A) the source of the data, (B) protocols and results of any relevant testing or analysis, (C) a description of the operation exempted and how the data demonstrate that employee exposures will not exceed the action level, (D) other data relevant to the operations, materials and employee exposures covered by the exemption.

**Add as attachment C:**

## ATTACHMENT C

### STATISTICAL ANALYSIS OF NCELS ANALYTICAL METHOD VERIFICATION RESULTS

This Attachment describes the statistical technique (with examples) for comparing the analytical results obtained by two laboratories pursuant to paragraph (c)(3)(vii) of the New Chemical Exposure Limit section of this Order.

#### STATISTICAL TECHNIQUE

To obtain two-sample t test with unequal variances, perform the following operations:

- Compute means of the data measured by two laboratories.
- Compute mean squares

$$S_i^2 = \sum(\bar{X}_{ij} - X_i)^2 / (n_i - 1), i=1, 2$$

- Form the ratio

$$T = (\bar{X}_1 - \bar{X}_2) / (W_1 + W_2)^{1/2}$$

- Compute degrees of freedom

$$f = (W_1 + W_2)^2 / [W_1^2 / (n_1 - 1) + W_2^2 / (n_2 - 1)]$$

where,

$$W_i = S_i^2 / n_i, i = 1, 2$$

$\bar{X}_1$  = Average of the results from the company laboratory

$\bar{X}_2$  = Average of the results from the independent laboratory

$n_1$  = Number of samples analyzed by the company laboratory

$n_2$  = Number of samples analyzed by the independent laboratory.

Then compare the absolute value of T to the 97.5 percentile point of a t distribution with f degrees of freedom. If the absolute value exceeds the 97.5 percentile point, the results measured by two laboratories are significantly different at 95% level. Otherwise, they are not significantly different. In general, f may not be an integer. Use interpolation to obtain the 97.5 percentile point of a t distribution with f degrees of freedom.

EXAMPLES -- The following examples (based on simulated data) illustrate the method:

Example 1

<u>Data Set 1</u>		<u>Data Set 2</u>	
	80.56		97.11
	100.01		102.13
	86.04		99.83
	52.61		97.83
	84.85		105.44
	95.75		100.04
$\bar{X}_1 = 83.30$	$n_1 = 6$	$\bar{X}_2 = 100.40$	$n_2 = 6$
$S_1^2 = 278.72$	$W_1 = 46.25$	$S_2^2 = 9.26$	$W_2 = 1.54$
Absolute value of T = 2.467		f = 5.33	

The t table shows that the 97.5 percentile point is 2.571 and 2.447 for 5 and 6 degrees of freedom, respectively. For 5.33 degrees of freedom, the 97.5 percentile point will be approximately 2.530 which is greater than the absolute value of T, 2.467. Hence, the means of two data sets are not significantly different at the 5% level.

However, if this problem had been treated as an ordinary two-sample t test, the means would be significantly different at the 5% level because the absolute of T is greater than 2.228, the 97.5 percentile point for the t distribution with 10 degrees of freedom.

Example 2

<u>Data Set 1</u>	<u>Data Set 2</u>
82.87	108.05
101.85	96.51
87.44	100.04
99.68	104.33
101.15	110.32
99.21	107.00

$$\bar{X}_1 = 95.37 \quad n_1 = 6$$

$$\bar{X}_2 = 104.37 \quad n_2 = 6$$

$$S_1^2 = 65.59 \quad W_1 = 10.93$$

$$S_2^2 = 27.25$$

$$W_2 = 4.54$$

$$\text{Absolute value of } T = 2.290$$

$$f = 8.54$$

The t table shows that for 8 and 9 degrees of freedom the 97.5 percentile point is 2.306 and 2.262, respectively. For 8.54 degrees of freedom the 97.5 percentile point will be approximately 2.282 which is less than the absolute value of T, 2.290. Hence, the means of two data sets are significantly different at the 5% level.

## **APPENDIX**

### **NCELS RESPIRATOR TABLES** **Measured Concentrations of PMN Substance and** **Corresponding Acceptable Respiratory Protection**

**Note to Program Managers:** Copy the appropriate respirator table below and paste into the NEW CHEMICAL EXPOSURE LIMIT section (e)(2) of the Consent Order. After copying the table into the Order, adjust the line spacing so that the table is single spaced and the rest of the Order is double spaced. **After you have copied and pasted the table into the Consent Order, delete this Appendix.**

#### **PARTICULATE RESPIRATOR TABLE**

**Measured**  
**Concentration**  
**of PMN Substance**

**Required Respiratory Protection**

≤ NCEL

No respiratory protection is required.

≤ 10 x NCEL

I) Any NIOSH-certified **air-purifying** elastomeric half-mask respirator equipped with N100 (if oil aerosols absent), R100, or P100 filters. [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete this respirator**]

(II) Any appropriate NIOSH-certified N100 (if oil aerosols absent), R100, or P100 **filtering facepiece** respirator. [Note: for filtering facepieces, an APF of 10 can only be achieved if the respirator is qualitatively or quantitatively fit tested on individual workers]. [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete this respirator**]

(III) Any NIOSH-certified **air-purifying** full facepiece respirator equipped with N100 (if oil aerosols absent), R100, or P100 filters. \* [**Note to Program Manager: Copy and paste the \* and the footnote below the table when selecting this respirator.**]

(IV) Any NIOSH-certified negative pressure (demand) **supplied-air** respirator equipped with a half-mask. [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete this respirator**]

(V) Any NIOSH-certified negative pressure (demand) **self-contained breathing apparatus** (SCBA) equipped with a half mask. [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete this respirator**]

\*A full facepiece air-purifying respirator, although it has a higher APF of 50, is required to provide full face protection because the PMN substance presents significant exposure concern for mucous membranes, eyes, or skin.

≤ 25 x NCEL

(I) Any NIOSH-certified **powered air-purifying** respirator equipped with a hood or helmet and HEPA filters.

(II) Any NIOSH-certified **powered air-purifying** respirator equipped with a loose fitting facepiece and HEPA filters.

(III) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a hood or helmet.

(IV) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a loose fitting facepiece.

≤ 50 x NCEL

(I) Any NIOSH-certified **air-purifying** full facepiece respirator equipped with N100 (if oil aerosols absent), R-100, or P-100 filter(s).

(II) Any NIOSH-certified **powered air-purifying** respirator equipped with a tight-fitting facepiece (half or full facepiece) and equipped with HEPA filters. [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete the half facepiece respirator**].

(III) Any NIOSH-certified pressure-demand or other positive pressure mode **supplied-air** respirator equipped with a half-mask. [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete this respirator**].

(IV) Any NIOSH-certified negative pressure (demand) **supplied-air** respirator equipped with a full facepiece.

(V) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a tight-fitting facepiece (half or full facepiece). [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete the half facepiece respirator**].

(VI) Any NIOSH-certified negative pressure (demand) **self-contained breathing apparatus** (SCBA) equipped with a hood or helmet or a full facepiece..

≤ 1000 x NCEL

(I) Any NIOSH-certified **powered air purifying** full facepiece respirator equipped with HEPA filters.

(II) Any NIOSH-certified **powered air-purifying** respirator equipped with a hood or helmet\* and N100 (if oil aerosols absent), R100, or P100 filters *with evidence demonstrating protection level of 1,000 or greater.\** [Note to Program Manager: Copy and paste the \* and the footnote below the table when selecting this respirator.]

(III) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a full facepiece.

(IV) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a hood or helmet *with evidence demonstrating protection level of 1,000 or greater.\** [Note to Program Manager: Copy and paste the \* and the footnote below the table when selecting this respirator.]

(V) Any NIOSH-certified **supplied-air** respirator equipped with a full facepiece.

\* OSHA has assigned APFs of 1000 for certain types of hoods and helmets with powered air purifying respirators (PAPRs) or supplied air respirators (SARs) where the manufacturer can demonstrate adequate air flows to maintain positive pressure inside the hood or helmet in normal working conditions. However, the employer must have evidence provided by the respirator manufacturer that the testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a Workplace Protection Factor (WPF) or Simulated Workplace Protection Factor (SWPF) study or equivalent testing. **Without testing data that demonstrates a level of protection of 1,000 or greater, all PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.**

> 1000 x NCEL  
(max. 10,000 x  
NCEL)

Any NIOSH-certified pressure-demand or other positive pressure mode (e.g., open/closed circuit) **self-contained breathing apparatus** (SCBA) equipped with a hood or helmet or a full facepiece.

### GAS/VAPOR RESPIRATOR TABLE

**Measured  
Concentration  
of PMN Substance**

**Required Respiratory Protection**

≤ NCEL

No respiratory protection is required.

≤ 10 x NCEL

*If Data on Cartridge Service Life Testing has been Reviewed and Approved by EPA:*

(I) Any NIOSH-certified **air-purifying** half mask respirator equipped with appropriate gas/vapor (acid gas, organic vapor, or substance specific) cartridges. [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete this respirator**].

(II) Any NIOSH-certified **powered air-purifying** respirator with a hood or helmet and with appropriate gas/vapor (acid gas, organic vapor, or substance specific) cartridges.

(III) Any NIOSH-certified negative pressure (demand) **supplied-air** respirator equipped with a half-mask. [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete this respirator**].

(IV) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a loose fitting facepiece, hood, or helmet.

(V) Any NIOSH-certified negative pressure (demand) **self-contained breathing apparatus** (SCBA) equipped with a half-mask. [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete this respirator**].

*If No Cartridge Service Life Testing has been Conducted:*

(I) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a loose fitting facepiece, hood, or helmet.

(II) Any NIOSH-certified negative pressure (demand) **supplied-air respirator** (half-mask or full facepiece). [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete the half facepiece respirator**].

(III) Any NIOSH-certified negative pressure (demand) self-contained breathing apparatus (SCBA) equipped with a half-mask. [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete this respirator**].

≤ 25 x NCEL

*If Data on Cartridge Service Life Testing has been Reviewed and Approved by EPA:*

(I) Any NIOSH-certified **powered air-purifying** respirator with a hood or helmet equipped with appropriate gas/vapor (acid gas, organic vapor, or substance specific) cartridges.

(II) Any NIOSH-certified powered **air-purifying** respirator equipped with a loose fitting facepiece with appropriate gas/vapor (acid gas, organic vapor, or substance specific) cartridges.

(III) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a hood or helmet.

(IV) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a loose fitting facepiece.

*If No Cartridge Service Life Testing has been Conducted:*

(I) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a loose fitting facepiece, hood, or helmet.

(II) Any NIOSH-certified negative pressure (demand) **supplied-air** respirator equipped with a full facepiece.

≤ 50 x NCEL

*If Data on Cartridge Service Life Testing has been Reviewed and Approved by EPA:*

(I) Any NIOSH-certified **air-purifying** full facepiece respirator equipped with appropriate gas/vapor cartridges or canisters (acid gas, organic vapor, or substance specific).

(II) Any NIOSH-certified powered **air-purifying** respirator equipped with a tight-fitting facepiece (half or full facepiece) and appropriate gas/vapor cartridges or canisters (acid gas, organic vapor, or substance specific).

(III) Any NIOSH-certified negative pressure (demand) **supplied-air** respirator equipped with a full facepiece.

(IV) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a tight-fitting facepiece (half or full facepiece). **[Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete the half facepiece respirator].**

(V) Any NIOSH-certified pressure-demand or other positive pressure mode **supplied-air** respirator equipped with a tight-fitting facepiece (half or full facepiece). [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete the half facepiece respirator**].

(VI) Any NIOSH-certified negative pressure (demand) **self-contained breathing apparatus** (SCBA) equipped with a hood, helmet, or a full facepiece.

*If No Cartridge Service Life Testing has been Conducted:*

(I) Any NIOSH-certified negative pressure (demand) **supplied-air** respirator equipped with a full facepiece.

(II) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a tight-fitting facepiece (half or full facepiece). [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete the half facepiece respirator**].

(III) Any NIOSH-certified pressure-demand or other positive pressure mode **supplied-air** respirator equipped with a tight-fitting facepiece (half or full facepiece). [**Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete the half facepiece respirator**].

(IV) Any NIOSH-certified negative pressure (demand) **self-contained breathing apparatus** (SCBA) equipped with a hood, helmet, or a full facepiece.

≤ 1000 x NCEL

*If Data on Cartridge Service Life Testing has been Reviewed and Approved by EPA:*

(I) Any NIOSH-certified **powered air purifying** full facepiece respirator equipped with appropriate gas/vapor (acid gas, organic vapor, or substance specific) cartridges.

(II) Any NIOSH-certified **powered air-purifying** respirator equipped with a hood or helmet and appropriate gas/vapor (acid gas, organic vapor, or substance specific) cartridges *with evidence demonstrating protection level of 1,000 or greater*. \* [**Note to Program Manager: Copy and paste the \* and the footnote below the table when selecting this respirator.**]

(III) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a full facepiece.

(IV) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a hood or helmet *with evidence demonstrating protection level of 1,000 or greater.* \* **[Note to Program Manager: Copy and paste the \* and the footnote below the table when selecting this respirator.]**

(VI) Any NIOSH-certified pressure-demand or other positive pressure mode **supplied-air** respirator equipped with a full facepiece.

*If No Cartridge Service Life Testing has been Conducted:*

(I) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a full facepiece.

(II) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a hood or helmet *with evidence demonstrating protection level of 1,000 or greater.* \* **[Note to Program Manager: Copy and paste the \* and the footnote below the table when selecting this respirator.]**

(III) Any NIOSH-certified pressure-demand or other positive pressure mode **supplied-air** respirator equipped with a full facepiece.

> 1000 x NCEL  
(max. 10,000 x  
NCEL)

Any NIOSH-certified pressure-demand or other positive pressure mode (e.g., open/closed circuit) **self-contained breathing apparatus** (SCBA) equipped with a hood or helmet or a full facepiece.

**COMBINATION PARTICULATE AND GAS/VAPOR RESPIRATOR TABLE**

**Measured  
Concentration  
of PMN Substance**

**Required Respiratory Protection**

≤ NCEL

No respiratory protection is required.

≤ 10 x NCEL

*If Data on Cartridge Service Life Testing has been Reviewed and Approved by EPA:*

(I) Any NIOSH-certified **air-purifying** half-mask respirator equipped with appropriate gas/vapor (acid gas, organic vapor, or substance specific) cartridges in combination with N100 (if oil aerosols absent), R100, or P100 filters or an appropriate canister incorporating N100 (if oil aerosols absent), R100, or P100 filters. **[[Note to Program Manager: If a**

**concern exists for eye/skin exposure from the chemical, delete this respirator**].

(II) Any NIOSH-certified **powered air-purifying** respirator with a hood or helmet and with appropriate gas/vapor (acid gas, organic vapor, or substance specific) cartridges in combination with HEPA filters.

(III) Any NIOSH-certified negative pressure (demand) **supplied-air** respirator equipped with a half-mask. **[[Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete this respirator]**.

(IV) Any NIOSH-certified continuous flow **supplied-air respirator** equipped with a loose fitting facepiece, hood, or helmet.

(V) Any NIOSH-certified negative pressure (demand) **self-contained breathing apparatus** (SCBA) equipped with a half-mask. **[[Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete the this respirator]**.

*If No Cartridge Service Life Testing has been Conducted:*

(I) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a loose fitting facepiece, hood, or helmet.

(II) Any NIOSH-certified negative pressure (demand) **supplied-air** respirator (half-mask or full facepiece). **[[Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete the half facepiece respirator]**.

(III) Any NIOSH-certified negative pressure (demand) **self-contained breathing apparatus** (SCBA) equipped with a half-mask. **[[Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete this respirator]**.

≤ 25 x NCEL

*If Data on Cartridge Service Life Testing has been Reviewed and Approved by EPA:*

(I) Any NIOSH-certified **powered air-purifying** respirator with a loose-fitting hood or helmet that is equipped with an appropriate gas/vapor (acid gas, organic vapor, or substance specific) cartridge in combination with HEPA filters.

(II) Any NIOSH-certified **powered air-purifying** respirator equipped with a loose fitting facepiece with appropriate gas/vapor (acid gas, organic vapor, or substance specific) cartridges in combination with HEPA filters.

(III) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a hood or helmet.

(IV) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a loose fitting facepiece.

*If No Cartridge Service Life Testing has been Conducted:*

(I) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a loose fitting facepiece, hood, or helmet.

(II) Any NIOSH-certified negative pressure (demand) **supplied-air** respirator equipped with a full facepiece.

≤ 50 x NCEL

*If Data on Cartridge Service Life Testing has been Reviewed and Approved by EPA:*

(I) Any NIOSH-certified **air-purifying** full facepiece respirator equipped with appropriate gas/vapor (acid gas, organic vapor, or substance specific) cartridges in combination with N100 (if oil aerosols absent), R100, or P100 filters or an appropriate canister incorporating N100 (if oil aerosols absent), R100, or P100 filters.

(II) Any NIOSH-certified **powered air-purifying** respirator with a tight-fitting facepiece (half or full facepiece) equipped with appropriate gas/vapor (acid gas, organic vapor, or substance specific) cartridges in combination with HEPA filters. **[Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete the half facepiece respirator]**

(III) Any NIOSH-certified negative pressure (demand) **supplied-air** respirator equipped with a full facepiece.

(IV) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a tight-fitting facepiece (half or full facepiece). **[[Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete the half facepiece respirator].]**

(V) Any NIOSH-certified pressure-demand or other positive pressure mode **supplied-air** respirator equipped with a tight-fitting facepiece (half or full facepiece). **[[Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete the half facepiece**

**respirator**].]

(VI)Any NIOSH-certified negative pressure (demand) **self-contained breathing apparatus** (SCBA) equipped with a hood or helmet or a full facepiece.

*If No Cartridge Service Life Testing has been Conducted:*

(I)Any NIOSH-certified negative pressure (demand) **supplied-air** respirator equipped with a full facepiece.

(II)Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a tight-fitting facepiece (half or full facepiece). **[[Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete the half facepiece respirator].]**

(III)Any NIOSH-certified pressure-demand or other positive pressure mode **supplied-air** respirator equipped with a tight-fitting facepiece (half or full facepiece). **[[Note to Program Manager: If a concern exists for eye/skin exposure from the chemical, delete the half facepiece respirator].]**

(IV)Any NIOSH-certified negative pressure (demand) **self-contained breathing apparatus** (SCBA) equipped with a hood or helmet or a full facepiece.

**≤ 1000 x NCEL**

*If Data on Cartridge Service Life Testing has been Reviewed and Approved by EPA:*

(I)Any NIOSH-certified **powered air purifying** full facepiece respirator equipped with an appropriate gas/vapor (acid gas, organic vapor, or substance specific) cartridge in combination with HEPA filters.

(II)Any NIOSH-certified **powered air-purifying** respirator with a loose-fitting hood or helmet that is equipped with an appropriate gas/vapor (acid gas, organic vapor, or substance specific) cartridge in combination with HEPA filters *with evidence demonstrating protection level of 1,000 or greater.* \* **[[Note to Program Manager: Copy and paste the \* and the footnote below the table when selecting this respirator.]**

(III)Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a full facepiece.

(IV)Any NIOSH-certified continuous flow **supplied-air respirator** equipped with a hood or helmet *with evidence demonstrating protection*

*level of 1,000 or greater.* \* **[Note to Program Manager: Copy and paste the \* and the footnote below the table when selecting this respirator.]**

(V) Any NIOSH-certified pressure-demand or other positive pressure mode **supplied-air** respirator equipped with a full facepiece.

*If No Cartridge Service Life Testing has been Conducted:*

(I) Any NIOSH-certified continuous flow **supplied-air** respirator equipped with a full facepiece. [provides eye/face protection].

(II) Any NIOSH-certified continuous flow **supplied-air respirator** equipped with a hood or helmet *with evidence demonstrating protection level of 1,000 or greater.* \* **[Note to Program Manager: Copy and paste the \* and the footnote below the table when selecting this respirator.]**

(III) Any NIOSH-certified pressure-demand or other positive pressure mode **supplied-air** respirator equipped with a full facepiece. [provides eye/face protection].

\* OSHA has assigned APFs of 1000 for certain types of hoods and helmets with powered air purifying respirators (PAPRs) or supplied air respirators (SARs) where the manufacturer can demonstrate adequate air flows to maintain positive pressure inside the hood or helmet in normal working conditions. However, the employer must have evidence provided by the respirator manufacturer that the testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a Workplace Protection Factor (WPF) or Simulated Workplace Protection Factor (SWPF) study or equivalent testing. **Without testing data that demonstrates a level of protection of 1,000 or greater, all PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.**

**> 1000 x NCEL  
(max. 10,000 x  
NCEL)**

Any NIOSH-certified pressure-demand or other positive pressure mode (e.g., open/closed circuit) **self-contained breathing apparatus (SCBA)** equipped with a hood or helmet or a full facepiece.