CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

CLEANUP AND ABATEMENT ORDER NO. 5-00-709

FOR
BALTIMORE AIRCOIL COMPANY INC.,
A WHOLLY OWNED SUBSIDIARY OF AMSTED INDUSTRIES, INC.
AND
FORMER OWNER, MERCK & CO., INC.
MERCED COUNTY

This Order is issued to the Baltimore Aircoil Company, Inc., a wholly owned subsidiary of Amsted Industries, Inc., and Merck & Co., Inc, the former owner of Baltimore Aircoil Company, Inc. (hereafter collectively referred to as the Discharger), based on provisions of California Water Code Section 13304 that authorizes the Regional Water Quality Control Board, Central Valley Region (hereafter Board) to issue a Cleanup and Abatement Order.

The Board finds, with respect to the Discharger's acts, or failure to act, the following:

1. The facility was operated by the Pritchard Company from 1961 to 1968 for cooling-tower fabrication. From 1961 to 1968, the Pritchard Company operated a kerosene wood treatment system. A pressure wood treatment system in the Retort Area was installed in 1969. In 1975, the Baltimore Aircoil Company (BAC), then a subsidiary of Merck & Co., Inc. (Merck), purchased the cooling-tower fabrication operation from AMICOR Incorporated. BAC subsequently purchased the land in 1981. The Baltimore Aircoil Company, including the entire Merced facility, was sold by Merck to Amsted Industries in 1985. Amsted no longer operates the facility for the manufacturing of cooling towers since its closure in February 1994.

2. The 40.5-acre facility, is comprised of Assessor's Parcel Number 57-500-34, in a portion of Lots 6, 7, and 8 in the S.E. 1/4 of Section 10, T7S, R13E, MDB&M, and a portion of Lots 1 and 2 in the N.E. 1/4 of Section 15, T7S, R13E, MDB&M as shown on Attachment A, which is incorporated herein and made part of this Order. The address is 3058 Beachwood Drive, approximately two miles northwest of the city of Merced, Merced County.

3. Historically, the facility has fabricated lumber for cooling towers and pressure treated the lumber after fabrication. Pressure treatment took place in a wood-treating retort. Process chemicals used in the retort area include the elements copper, chromium, and arsenic. Pressure treatment of lumber was discontinued in May of 1991, and associated equipment has been removed.

4. Surface water from the site drained to an impoundment on the southeast corner of the site that, in 1986, was regulated by the Toxic Pits Cleanup Act. As requested by the Board and the Department of Toxic Substances Control (DTSC), a site investigation was conducted in 1990. The investigation assessed the affect of the wood treatment operations on soil and groundwater quality at the storm water retention pond, retort (wood treatment vessel), and treated wood storage areas. The impoundment was subsequently clean-closed in 1991

under the authority of the Board and the Department of Toxic Substances Control (DTSC). The existing storm water retention pond is located on the site, as shown on Attachment B, which is incorporated herein and made part of this Order. The stormwater pond receives runoff from on-site and off-site areas and discharges to the adjacent El Capitan (a.k.a. Black Rascal Canal) drainage canal near the southeast corner of the property. The El Capitan drainage canal, which is owned by the Merced Irrigation District (MID), drains to Bear Creek, tributary to Salt Slough, and the Eastside Bypass of the San Joaquin River. The BAC, Inc. facility has a Statewide General Industrial Activities Storm Water Discharge Permit, identification number WDID 5B24S006048, dated 24 October 1992.

5. *Geology*: Four stratigraphic units, or portions of units, are of immediate concern because of their significance to groundwater remediation at the site. They are the Quaternary Older Alluvium (Riverbank and Modesto Formations) from the surface to a depth of approximately 90 feet below ground surface (bgs) consisting of intercalated beds of sand, silt, and clay, including some hardpan. Within this stratigraphic sequence is a shallow silt-hardpan bed within the Older Alluvium at a variety of depths between approximately 55 to 80 feet bgs. Below that is a clay unit of topmost Plio-Pleistocene, Upper Turlock Lake Formation at a depth of about 90 to 100 feet bgs. This formation consists of fluvial, interbedded gravel, sand, silt, and lacustrine clay.

6. *Hydrogeology*: Groundwater in the vicinity of the site currently flows generally to the north, except near extraction wells and radial flow away from the ponded area at the southern corner of the property. The estimated average linear velocity (groundwater flow rate) is approximately 90 feet per year in the Shallow Aquifer. The current measured groundwater elevation is approximately 40 feet bgs. The groundwater flow is influenced seasonally by pumping irrigation wells and possibly municipal supply wells in the area.

7. Site investigations from 1990-1999 resulted in the definition of the extent and nature of groundwater contamination to the 50 µg/l level of total chromium. Monitoring of the total chromium plume has shown that the current extraction and reinjection system cannot contain the spreading plume, as shown on Attachment B, due to the lack of an alternative discharge outlet to the current reinjection Gallery I because it is located inside of the plume due to the lack of an alternative discharge outlet to the current reinjection Gallery I because it is located inside the plume.

8. The heavy metal plume has extended into a subdivision area southwest of the facility that is presently supplied with municipal water from the Meadowbrook Water Company. The BAC, Inc. facility plume commingles with a petroleum hydrocarbon plume as gasoline (TPH-G), benzene, toluene, ethylbenzene, and xylene (total) (BTEX), and possibly other contaminants associated with gasoline (e.g., oxygenates) originating from a separate off-site source area from the leaky underground storage tank at the corner of Beachwood Drive and Dan Ward Road. Wells constructed during the environmental investigation, M&A-1, M&A-2 and extraction well EW-4, EW-5, and EW-6, indicate the presence of heavy metals from the BAC, Inc. facility plume, as well as contaminants, which originated from the corner of Beachwood Drive and Dan Ward Road.

9. The Discharger is not responsible for the investigation or cleanup of discharges of BTEX, TPH-G or other organic chemicals resulting from contamination found at the corner of Beachwood Drive and Dan Ward Road and, therefore, this Order does not specify cleanup levels for groundwater for those constituents. The Discharger, however, is responsible for the discharge of water it extracts from the area and is required to treat any water that it extracts from the plume to meet all applicable discharge limitations for petroleum hydrocarbons. The Discharger has incorporated treatment of hydrocarbons in their treatment system since the hydrocarbon plume is being extracted as part of the cleanup of its heavy metals plume. Because the Discharger has impacted the petroleum hydrocarbon plume via a groundwater extraction system, the Discharger is responsible for monitoring the quality of the groundwater it extracts from that area.

10. The site investigations completed to date have shown that the groundwater beneath the facility contains highly elevated levels of chromium, and lesser levels of arsenic and copper. Soils underlying the source areas at the site (i.e., retort area and drip pad) contain elevated chromium, arsenic, and copper concentrations. The extent of contamination of heavy metals in groundwater and the extent of contamination of heavy metals in soil may require additional delineation.

11. Current 1999 groundwater data show maximum concentrations of total chromium (Cr) at 27,200 µg/l, copper (Cu) at 434 µg/l, and arsenic (As) at 50.6 µg/l. These levels exceed background and beneficial use protective levels (i.e., water quality objectives), as follows:

Constituents	Units	Background	Water Quality Objectives
Total Chromium	µg/l	6	50
Hexavalent Chromium	µg/l	TBD*	0.2
Copper	µg/l	6	170
Arsenic	µg/l	4	5
Total Dissolved Solids	mg/l	500	450

*TBD= To Be Determined

Therefore, a condition of groundwater pollution exists. Chromium has migrated offsite in the groundwater as demonstrated by offsite monitoring wells. Continuing site investigations revealed that a plume of groundwater contaminants is moving from the former wood pressure treatment area (Retort Area) and has traveled approximately 900 feet offsite to the southwest and approximately 1200 feet to the north. The plume size estimate is based on the 50 µg/l total chromium isoconcentration contour interpolated from monitoring well data. The arsenic and copper fraction of the plume is concentrated in the area of the Retort Area on-site.

12. Since 1994, the Discharger has operated a groundwater remedial system for extraction and treatment of the heavy metal contaminant plume to prevent further downgradient

movement offsite. The initial objectives of the groundwater remedial system were to provide hydraulic and source control to minimize migration of constituents of concern and to determine the response of the aquifer to long-term remedial pumping and reinjection.

13. Reinjection operations were limited by formation permeability and the efficiency of the reinjection wells themselves. The limited flow capacity of the reinjection system prevented the Discharger from extracting water at the intended rate and thereby hampered the Discharger from continuously operating the extraction system. In addition, increased water elevation due to the end of a lengthy drought period and the direction of groundwater flow was subsequently observed to rotate clockwise and flow westerly to northerly limiting the effectiveness of the reinjection wells in maintaining the hydraulic control.

14. On 3 May 1996, the Board adopted Revised Order No. 96-138. It regulated a proposed groundwater infiltration gallery, in combination with selective removal of soil containing elevated chromium, arsenic and copper from the retort area; construction of three additional extraction wells; installation of additional monitoring wells; possible discharge of treated water to the MID El Capitan Canal; and cessation of injection through wells RW-1 through RW-6.

15. The selection of the excavation design for the infiltration gallery (Gallery I) beneath the Retort Basin was based on: (1) the Board's requirement to remediate contaminated soil, (2) the requirement to flush the source of heavy metals to the groundwater for extraction, and (3) to provide a basin for disposal of treated wastewater. Excavation was designed to effectively remove approximately 30-70% of the mass of anthropogenic chromium, copper, and arsenic in the soil near the Retort Basin. The Discharger resurfaced a portion of soil and asphaltic concrete cover surrounding the Retort Basin area. The area was resurfaced to minimize both the potential for windblown transport of metal-impacted soil and the infiltration of surface water.

16. On 3 May 1996, WDR Order No. 96-100 (NPDES permit CA 008895) was adopted for the discharge of treated groundwater to the El Capitan (a.k.a. Black Rascal Extension Canal). Effluent from the original treatment process has never been discharged to the canal because the concentrations of TDS did not meet water quality objectives specified in Order No. 96-100.

17. A study was initiated on 8 June 1998 and completed in September 1998 that demonstrated the ability of a new chemical treatment process to lower TDS levels to near background, while maintaining metals concentrations below long-term discharge goals specified in Order No. 96-138.

18. On 12 July 1999, the Board received a *Report of Waste Discharge* (RWD). The RWD documents the evaluation of two alternatives for long-term discharge of treated groundwater: 1) A new infiltration gallery (Gallery II) in the northeastern corner of the facility, outside of the plume boundaries, which includes additional extraction wells,

and 2) discharge of the treated groundwater to the Merced Irrigation District (MID) El Capitan under a revised NPDES permit.

19. Based upon the Board's request, the Discharger submitted the *Work Plan for Soil Sampling in the Treated Wood Storage Area*, dated 13 April 1999. It describes the objectives, methods, and rationale for sampling of shallow soils in the treated wood storage area to evaluate this area as a potential source for impact to groundwater. Also included was a summary of previous surface soil investigations in this area.

20. Based upon the Board's request, the Discharger submitted the *Offsite Well Survey Update Report*, dated 1 June 1999. The report concludes that three Meadowbrook Water Company municipal wells, one MID irrigation well and 116 private domestic, irrigation, and monitoring wells are within a one-mile radius of the facility. The Discharger performed a one time sampling of two domestic wells downgradient of the facility. The closest inactive domestic well, Well 16, showed 8.5 µg/l of total Cr. The closest active domestic well, Well 14, one time sampling event showed total Cr at 3.9 µg/l. The residence supplied by Well #14 was connected to the public water supply on 15 December 1999 and Well #14 was closed on 13 March 2000.

21. As part of the ongoing public participation portion of the project, the Board requested the Discharger notify the public of the results of the well survey, the status of the groundwater cleanup, and the monitoring and reporting program. On 23 July 1999, the Discharger hand delivered a Board staff approved letter, describing the above information, to owners of wells possibly impacted by the plume.

22. The Discharger has caused or permitted waste to be discharged or deposited where it has discharged to waters of the state and has created, and continues to threaten to create, a condition of pollution or nuisance.

23. The Board's *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, (Fourth Edition), 1998* (Basin Plan) establishes beneficial uses of the waters of the state and water quality objectives to protect those uses. The beneficial uses of the groundwater beneath the site are domestic, municipal, industrial, and agricultural supply.

24. The State Water Resources Control Board has adopted Resolution No. 92-49, the "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304." This Policy sets forth the procedures to be used during an investigation or cleanup of a contaminated site and requires that cleanup standards be consistent with State Water Board Resolution 68-16 (the antidegradation policy). Resolution 92-49 and the Basin Plan establish the cleanup levels to be achieved. Cleanup standards shall also be consistent with Title 27, Division 2, Subdivision 1, §20400 of the California Code of Regulations (CCR).

25. Section 20400 of Title 27 of the CCR states, in part:

"(c) For a corrective action program, the Regional Board shall establish a concentration limit for a constituent of concern that is greater than the background value of that constituent only if the Regional Board finds that it is technologically or economically infeasible to achieve the background value for that constituent and that the constituent will not pose a substantial present or potential hazard to human health or the environment as long as the concentration limit greater than background is not exceeded."

"(e) In no event shall a concentration limit greater than background established under this section for a constituent of concern exceed the lowest concentration that the discharger demonstrates and the Regional Board finds is technologically and economically achievable. No provision of this section shall be taken to allow a concentration limit greater than background, for a constituent of concern, to exceed the maximum concentration that would be allowed under other applicable statues or regulations..."

"(g) Proposals for concentration limits greater than background shall include a demonstration that the aggregate of hazardous constituents in the environment will not result in excessive exposure to a sensitive biological receptor. In the absence of scientifically valid data to the contrary, theoretical risks from chemicals associated with the release from the waste management unit shall be considered additive across all media of exposure, and shall be considered additive for all chemicals having similar toxicological effects or having carcinogenic effects."

26. The Basin Plan, Chapter III, Water Quality Objectives, states, in part:

"Groundwaters shall not contain chemical constituents in concentrations that adversely affect beneficial uses.

"Groundwaters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels specified in Title 27, CCR.

"Groundwaters designated for use as agricultural supply (AGR) shall not contain concentrations of chemical constituents in amounts that adversely affect such beneficial use.

"Groundwater shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses."

27. In 1999, the California EPA's Office of Environmental Health Hazard Assessment (OEHHA) adopted new Public Health Goals (PHGs) for chemicals in drinking water. PHGs are levels of drinking water contaminants at which adverse health effects are not expected to occur from a lifetime of exposure. The PHG for total chromium and health protective levels for tri- and hexavalent chromium are listed in the *PHG for Chromium in Drinking Water* (Feb. 1999, OEHHA) as follows:

Total chromium*	2.5 µg/l (ppb)
Hexavalent chromium (Cr VI)	0.2 µg/l (ppb)
Trivalent chromium (Cr III)	200,000 µg/l (ppb)

* Total chromium = based on the assumption that 7.2 percent of the chromium in the sample is hexavalent chromium (Cr VI). If Cr VI and Cr III concentrations are both below their individual levels, then a water quality problem may not exist.

28. The Department of Health Services has established the California Drinking Water Standard, Primary Maximum Contaminant Level (MCL) for total chromium at 50 µg/l (ppb).

29. Section 13304(a) of the California Water Code provides that:

"Any person who has discharged or discharges waste into waters of this state in violation of any waste discharge requirements or other order or prohibition issued by a Regional Board or the state board, or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the state and creates, or threatens to create, a condition of pollution or nuisance, shall upon order of the Regional Board clean up the waste or abate the effects of the waste, or, in the case of threatened pollution or nuisance, take other necessary remedial action, including but not limited to, overseeing cleanup and abatement efforts. Upon failure of any person to comply with the cleanup or abatement order, the Attorney General, at the request of the board, shall petition the superior court for that county for the issuance of an injunction requiring the person to comply with the order. In any such suit, the court shall have jurisdiction to grant a prohibitory or mandatory injunction, either preliminary or permanent, as the facts may warrant."

30. Section 13267(b) of the California Water Code provides that:

"In conducting an investigation specified in subdivision (a), the Regional Board may require that any person who has discharged, discharges, or is suspected of discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of discharging, or who proposes to discharge waste outside of its region that could affect the quality of waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the Regional Board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports."

31. Section 13304(c)(1) of the California Water Code provides that:

> ". . . the person or persons who discharged the waste, discharges the waste, or threatened to cause or permit the discharge of the waste within the meaning of subdivision (a), are liable to that government agency to the extent of the reasonable costs actually incurred in cleaning up the waste, abating the effects of the waste, supervising cleanup or abatement activities, or taking other remedial actions. . ."

32. The Discharger has agreed to pay the costs related to staff oversight of this investigation and remediation.

33. The issuance of this Order is an enforcement action taken by a regulatory agency and is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000, et seq.), pursuant to Section 15321(a)(2), Title 14, California Code of Regulations.

34. Any person affected by this action of the Regional Board may petition the State Water Resources Control Board (State Board) to review the action in accordance with Title 23 California Code of Regulations Sections 2050-2068. The State must receive the petition within 30 days of the date of this Order. Copies of the law and regulations applicable to filing petitions will be provided upon request. In addition to filing a petition with the State Board, any person affected adversely by this Order, may request the Regional Board to reconsider this Order. Such request should be made within 30 days of the dates of this Order. Note that even if reconsideration by the Regional Board is sought, filing a petition with the State Board within the statutory time period is necessary to preserve the petitioner's legal rights.

IT IS HEREBY ORDERED that, pursuant to Section 13267 of the California Water Code, the Baltimore Aircoil Company Inc., a wholly owned subsidiary of Amsted Industries, Inc., and former owner Merck & Co., Inc., shall:

1. Continue to reimburse the Regional Water Quality Control Board for reasonable costs (as estimated by Board staff at the beginning of each fiscal year in accordance with Section 13365 of the Water Code) associated with oversight of the cleanup of this facility. Failure to do so shall be considered a violation of this Order.

2. Investigate, clean up, and abate, forthwith, the unsaturated zone and groundwater contaminated by activities at 3058 Beachwood Drive, Merced, California in conformance with the State Board's *Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304* and with the Regional Board's *Water Quality Control Plan for the Sacramento River and San Joaquin River Basin, 4th Edition, 1998* (in particular the Policies and Plans listed within the Control Action Considerations portion of Chapter IV) and Waste Discharge Requirements Order No. 5-00-197. "Forthwith" means as soon as is reasonably possible. Compliance with this requirement shall include, but not be limited to, the measures listed below.
The Discharger shall complete the following activities:

a. Groundwater Cleanup

Continue to operate and upgrade the groundwater remediation system, as necessary, for extracting and treating contaminated groundwater until the Discharger cleans up and abates the effects of waste discharges such that in situ groundwaters contain concentrations of total chromium, hexavalent chromium, arsenic, copper and total dissolved solids which are at or below the higher of background concentrations or water quality objectives, as shown below, or the lowest concentrations greater than background that are technologically and economically achievable as approved by the Board:

Constituents	**Units**	**Water Quality Objectives**	**Numerical Limit Interpreting Water Quality Objectives**		**Background Concentrations**
			Source	**Limit**	
Total Chromium	µg/l	Chemical Constituents	Primary MCL	50	6
Hexavalent Chromium	µg/l	Toxicity	CA Health Protective Level	0.2	To Be Determined
Copper	µg/l	Toxicity	CA Public Health Goal	170	6
Arsenic	µg/l	Toxicity	Proposition 65 Regulatory Level	5	4
Total Dissolved Solids	mg/l	Chemical Constituents	Agricultural Use	450	500

b. Unsaturated Zone Cleanup

The Discharger shall cleanup and abate, according to a time schedule approved by the Board, the effects of waste discharges such that soil remaining at the site contain concentrations at or below background for total chromium, hexavalent chromium, arsenic, and copper or until it has been determined that there is no longer a threat to water quality. In no event shall the discharger be required to meet cleanup levels that are not technically and economically achievable as demonstrated to and approved by the Board.

3. By **1 December 2000**, the Discharger shall submit a monitoring plan for downgradient use wells to include known domestic and agricultural wells. The approved plan shall become part of the Monitoring and Reporting Program Order No. 5-00-197.

4. By **1 February 2001**, the Discharger shall expand the disposal capacity of the effluent discharge system (i.e., Gallery II) based on a design approved by the Board. In addition, the Discharger shall install monitoring wells, as well as install extraction wells in the most optimum positions to enhance the capture of the hexavalent chromium plume, discharge at Gallery I, and the high concentrations detected at CPT-5A (18,000 mg/l chromium). At a minimum, one monitoring well must be installed in the most optimum location

downgradient from Gallery II to monitor underlying groundwater in conformance with WDRs Order No. 5-00-197, Groundwater Limitations.

5. By **1 April 2001**, the Discharger shall complete the following activities:

   a. submit for approval by the Board, a work plan and time schedule describing a Site Investigation to define the lateral and vertical extent of contamination (hexavalent chromium, total chromium, arsenic and copper) in the groundwater, in accordance with 2 a. above (Groundwater Cleanup);

   b. submit for approval by the Board, a work plan and time schedule describing a Site Investigation to define the lateral and vertical extent of contamination (hexavalent chromium, total chromium, arsenic and copper) in the unsaturated zone, in accordance with 2 b. above (Unsaturated Zone Cleanup).

6. By **1 July 2002**, submit for approval by the Board, a feasibility study and remedial option report that evaluates the technologic and economic feasibility of achieving groundwater cleanup. The Discharger is required to meet the minimum standards outlined in Attachment C, which is incorporated herein and made part of this order.

7. By **1 July 2002**, submit for approval by the Board, a feasibility study and remedial option report that evaluates the technologic and economic feasibility of achieving soil cleanup. The Discharger is required to meet the minimum standards outlined in Attachment C, which is incorporated herein and made part of this order.

8. By **1 February 2001**, and annually thereafter, the Discharger shall submit proposed modifications to the groundwater remedial system in the CAO Monitoring and Reporting Program Order No. 5-00-197 report.

9. The Discharger shall maintain hydraulic control of the contaminant plume at all times.

10. The Discharger shall provide alternative drinking water supplies for any known domestic wells containing constituents of concern attributable to the former BAC, Inc. facility as the source of contamination or pollution.

11. As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all reports shall be prepared by, or under the supervision of, a registered professional engineer or geologist and signed by the registered professional.

12. Work shall be conducted only after documents are approved or conditionally approved by Regional Board staff. The Discharger must incorporate all conditions of approval into the documents before they are deemed final. All reports shall include a cover letter from the Discharger stating concurrence or nonconcurrence with the conclusions and recommendations in the document.

13. If, for any reason, the Discharger is unable to perform any activity or submit any document in compliance with the schedule set forth herein, or in compliance with any work schedule submitted pursuant to this Order and approved by the Board, the Discharger may request, in writing, an extension of the time specified. The extension request shall include justification for the delay. An extension shall be granted with written approval either of the Executive Officer or by revision of this Order.

14. Notify Board staff at least five working days prior to any on-site work, testing, or sampling.

15. Obtain all local and state permits necessary to fulfill the requirements of this Order prior to beginning the work.

16. Maintain continuous operations of the cleanup system(s) and continue any remediation or monitoring activities until such time as the Board determines that sufficient cleanup has been accomplished and this Order has been rescinded. Sufficient cleanup has been accomplished when contaminant levels in soil or groundwater have been reduced to the higher of background or water quality objectives or levels determined to be technically and economically feasible as approved by the Board.

17. If, the Discharger fails to comply with the provisions of this Order, the Board may refer this matter to the Attorney General for judicial enforcement or may issue a complaint for administrative civil liability.

This Order is effective upon the date of signature.

GARY M. CARLTON, Executive Officer

25 September 2000
(Date)

KAS