SCHOOL OF
CIVIL ENGINEERING

INDIANA

DEPARTMENT OF TRANSPORTATION

JOINT HIGHWAY RESEARCH PROJECT

FHWA/IN/JHRP-92/22
Final Report

DEVELOPMENT OF A STRATEGY FOR
COMPLIANCE WITH EPA AND OSHA
REGULATIONS APPLICABLE TO INDOT
FACILITIES

Lynn A. Corson, Ph.D., Director
Environmental Management and
Education Program

PURDUE UNIVERSITY

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APPLICABLE TO INDOT FACILITIES

Lynn A. Corson, Ph.D., Director
Environmental Management and Education Program

Joint Highway Research Project

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The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration and the Indiana Department of Transportation. This report does not constitute a standard, specification, or regulation.

Purdue University
West Lafayette, IN 47907

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16. Abstract <p>Between March 1990 and November 1992, a sample of 27 field and support facilities operated by the Indiana Department of Transportation were visited by staff of the Environmental Management and Education Program, School of Civil Engineering, Purdue University, for the purpose of conducting workplace assessments to ascertain the department's compliance with federal and state environmental and worker protection regulations.</p> <p>Thirty-eight different department operations and nine different employee functions were observed and analyzed. There were compliance areas at every facility visited which needed strengthening. A total of 222 recommendations for strengthening those areas are included in the research report.</p> <p>The department has implemented or has made plans to implement most of the recommendations concerning environmental compliance areas. The same is expected with regard to the occupational safety and health compliance areas.</p>			
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The author also acknowledges the assistance of the many INDOT District, Sub-district, and Unit managers and other employees who willingly shared information about environmental and worker protection issues with the assessment team.

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LIST OF ATTACHMENTS

- 1 INDOT Facilities Workplace Assessment of Environmental & Worker Protection Based on Observations at Various INDOT Field & Support Facilities - Part I: Environmental Compliance Issues; Part II: Occupational Health & Safety Compliance Issues
- 2 Report of Industrial Hygiene Assessments at INDOT Field and Support Facilities

INTRODUCTION

An employer with numerous fixed workplaces and temporary worksites must assess its environmental and worker protection regulatory compliance responsibility on the broadest possible scale. Typically, private corporations design a corporate compliance policy document for dissemination to area manufacturing facilities to adapt to specific conditions at that facility. Implementation of the policy becomes the responsibility of plant management with oversight provided by one or more corporate officials.

The Indiana Department of Transportation, with its numerous facilities and worksites, is a hazardous waste generator; many of its employees use hazardous chemicals in the performance of their tasks; spills and releases of these chemicals can occur, and there is the potential for environmental degradation resulting from an accident involving the use of chemicals and from improper storage of these chemicals at the facility, in buildings or on the premises.

In October 1985, the Environmental Management and Education Program, then part of the Center for Public Policy and Public Administration at Purdue, was requested by Robert Lowry, Materials Service Engineer with the Department, to submit a proposal for training 30 employees in each of six district offices on the emergency procedures and Emergency Contingency Plan requirements of the EPA RCRA regulations (40 CFR 265.16, 265.30, and 265.50). This proposal evidently was not accepted, so in January 1986, Mr. Lowry requested that EMEP submit an offer to train 25 Department employees as trainers who could provide training pursuant to the aforementioned regulations. EMEP provided the proposal; however, no action was taken by the Department.

In the course of developing that proposal, the researcher visited two Department facilities and conducted a workplace assessment of the chemical use, storage, and disposal procedures and practices.

The Crawfordsville sub-district was one of the sites visited. Its Interim Storage Facility Contingency Plan was reviewed. The Division of Materials and Testing facility on Shortridge Road in Indianapolis was also visited and its Contingency Plan reviewed. At Mr.

Lowry's request, a review of the "Hazardous Waste Management" class outline was also performed.

There was no further contact with the department until the approval of this JHRP research study in March of 1990.

The Indiana Department of Transportation is not the only government agency or state highway department to initiate a comprehensive regulatory compliance strategy in the 1990's. Indeed, in the opinion of most government and agency administrators in the nation, until the late 1980's, the environmental and worker protection regulations were for the private, not the public sector. And some of those regulations were not "expanded" to the public sector until the late 1980's. In some states, there is no state enforcement of worker safety regulations and the federal OSHA law doesn't pertain to public sector employees.

The expansion of the OSHA Hazard Communication Standard (Employee Right-To-Know) to the public sector in 1988 alerted government to the need for planning and employing training to control the hazards of chemicals used in its facilities. Also in 1988, EPA issued a regulation extending coverage of the OSHA Hazardous Waste Operations and Emergency Response ("Hazwoper") rule to public sector employees in states without their own OSHA agencies or where there were laws exempting public employees. As a result of that extension, any public employer expecting its employees to respond to spills of hazardous chemicals in its workplaces must train those employees to the degree of competency specified in the regulations.

Indiana's hazardous waste management regulations were not strictly enforced, even for the private sector, until the Indiana Department of Environmental Management was created in 1986. And then, underfunded and short of staff, the environmental agency had to stretch its resources to provide adequate coverage of the private sector.

Most public sector entities prior to the late 1980's didn't perceive of themselves as hazardous waste generators or in any way contributing to the degradation of the environment. The "by-products" of public service activity were often stored out-of-sight,

reused in some way, or hauled away and deposited by a local trucking firm, petroleum distributor, or liquid industrial waste transporter.

Regulatory agencies began to attack the terminus of the waste management process--the treatment, storage, and disposal facilities--and the transporters who hauled the waste to those facilities. Quickly, loads of by-products were rejected for failing to be properly analyzed, labeled and manifested. The "backflow" of regulatory enforcement soon impacted the generator facilities and those that had no "back lot" on which to store the by-products began to properly manage their waste.

Departments of Transportation and their progenitor, Highway Departments, always had space at their highway "garages" or elsewhere to store unused, partially used, and almost empty containers. Containers of product that might someday be used were stored along side the others; usually out of site, therefore out of mind. Many of the administrative positions in these departments and their field offices have been and, today, remain part of the patronage appointment system, so continuity of management interest in and oversight of such an issue as hazardous waste management was seldom realized.

The American Association of State Highway and Transportation Officials and the National Cooperative Highway Research Project have, since 1990, issued a considerable body of guidance to assist the efforts of state transportation departments to comply with environmental regulations and environmental topics are usually on the agenda of transportation conferences and seminars sponsored by these and other organizations.

The education of state transportation officials and the expansion of regulatory activity, generally, to the public sector has created a milieu in which full compliance can be achieved. The Indiana Department of Transportation has made remarkable gains in the past two years. Hopefully, this research report will buttress its management's pursuit of full compliance with both environmental and worker protection regulations.

PROBLEM STATEMENT

Private and public employers are required to comply with various employee and environmental protection laws and regulations:

- Resource Conservation and Recovery Act (RCRA) Regulations (40 CFR Parts 264/265): These regulations require any facility that generates hazardous waste to properly analyze and characterize that waste, segregate non-compatible wastes in storage, manifest such wastes, and to provide for its transportation to a permitted facility for treatment or disposal.
- EPA Pollution Preventive Initiative Program: EPA is promoting pollution prevention through reducing or eliminating discharges and/or emissions to the environment through the implementation of source reduction and recycling. Source reduction can be accomplished through substitution for currently-used raw materials, process modification, improved "housekeeping," and on-site recycling. The 1990 Pollution Prevention Act requires hazardous waste generators and others to initiate plans to reduce and, eventually, eliminate pollutants.
- Superfund Amendment and Reauthorization Act of 1986, Title III Emergency Planning and Community-Right-To-Know Act and regulations pertaining thereto (40 CFR Parts 350, 355, 370, 372): Employers owning facilities where hazardous chemicals are manufactured, stored, or used are required to conduct an annual inventory of those chemicals, determine the maximum and average daily amount on-site, compare these quantities to statutory and regulatorily-established threshold amounts and report those regulated substances which exceed the thresholds to the local fire department, the Local (County) Emergency Planning Committee, and the Indiana Emergency Response Commission.

- Hazardous Waste Operations and Emergency Response Rule (29 CFR 1910.120): Employers who intend that employees will respond to spills and releases of hazardous chemicals, other than those incidental to normal operations, are required to provide employees with training. In facilities where employees, upon recognition of a spill, are required to alert supervisors to initiate the emergency contingency plan, only 8 hours of "Awareness" training is required. If employees are expected to initiate defensive measures, such as keeping others away from the spill site or applying absorbent material, then, 24 hours of training is required. Employees who will put on personal protective equipment, including respiratory protection, and will plug and patch a drum or repair a leaking bulk storage tank are required to have at least 40 hours of training.
- OSHA Hazard Communication Standard (Employee Right-To-Know regulation) (29 CFR 1910.1200) requires employers to develop a written Hazard Communication Program describing policies and procedures related to labeling containers of hazardous chemicals, maintaining Material Safety Data Sheets (MSDSs) for each chemical product, inventorying stationary process containers and portable containers, identifying and training employees to perform non-routine tasks, identifying pipes or piping systems containing chemicals, and establishing procedures for assuring compliance by contractors. The Hazard Communication Standard also requires employers to provide initial training to employees concerning the hazards of the chemicals to which they are or may be exposed, the proper personal protective equipment to wear when handling chemicals, the employer's labeling system, the information on MSDSs and how to access such information, and other related topics.

These four regulations and the pollution prevention program prompt employers to design a compliance strategy to maximize the interface between the U.S. EPA and U.S. OSHA requirements because

- each federal agency has an Indiana counterpart; the Indiana Department of Environmental Management and the Indiana Occupational Safety and Health Administration, respectively
- the chemicals and chemical products found in the workplace are regulated by both agencies pursuant to the four regulations
- each of the regulations require employers to take action to provide for employee and environmental protection
- there are cost benefits from addressing the four regulations and the pollution prevention program in one comprehensive compliance program

OBJECTIVES

A variety of work tasks were performed by the research staff to assess the compliance status of the Indiana Department of Transportation. Additionally, various training and technical assistance services were provided by the staff of the Environmental Management and Education Program to facilitate compliance with environmental and worker protection regulations. These objectives, specified as work tasks, include those in the initial research proposal (September 7, 1989), the expansion and extension proposal (August 5, 1991), and the extension proposal (March 25, 1992).

I. Initial Proposal

Task A: Conduct a two-day workplace assessment of a representative sample of facilities to examine the physical facility, operations, and procedures and policies with respect to the requirements of each of the five regulatory and program parameters (named in the Introduction).

Task B: Prepare a written report of the workplace assessments with recommendations for a Department comprehensive compliance plan.

Task C: Review the reports and recommendations with Department officials; secure approval and enumeration of priority areas to be addressed. The material presented under this task will be structured so that appropriate assignment of responsibilities can be made to maximize the benefits of Task E below.

Task D: Conduct workplace assessment, if necessary, of facilities or worksites not characterized in the report.

Task E: Implement training and technical assistance programs in a manner specified by the Department based on its priorities and resources to support the proposed activities.

Sub-Task 1 (RCRA): Establish the parameters for a Waste Management Program, including waste stream analysis and characterization, manifest tracking procedures, waste container labeling and segregation, transporter contracting, waste disposal and treatment monitoring.

Sub-Task 2 (RCRA): Prepare a training curriculum pursuant to the requirements of 40 CFR 265.16 (RCRA Personnel Training regulation).

Sub-Task 3 (RCRA): Conduct training, pursuant to Sub-Task 2, for individuals who will conduct training of employees throughout the Department organization.

Sub-Task 4 (Pollution Prevention): Conduct a series of pollution prevention waste audits and prepare a report with recommendations for waste minimization, source reduction, and recycling throughout the Department organization.

Sub-Task 5 (Community Right-To-Know): Perform the following services for a facility in each of the representative sites chosen:

- Create a computer file listing the hazardous chemicals and the hazardous constituents in mixtures as the names appear on Material Safety Data Sheets, the Chemical Abstract Service number, and the percent by weight of each chemical.
- Compare the computer file of Material Safety Data Sheets for hazardous chemicals present at the facility with the Community Right-To-Know List of Regulated Hazardous Substances and print a separate list of the chemicals subject to the reporting requirements of each section of the regulations.
- With information provided by the facility, calculate the maximum amount (in pounds) of the chemicals, including the hazardous constituents in mixtures, present at the facility at any time and the average daily amount. Compare these amounts with the regulatory threshold quantities established by each section of the regulation to identify the chemicals which must be reported.

- Prepare letters, complete forms, and provide other documentation required for compliance with various sections of the Act for submission to local, state, and federal regulatory agencies:

Sect. 302 - Notification letter to the State Emergency Response Commission (SERC) (if such has not been submitted).

Sect. 303 - Notification to the SERC and Local Emergency Planning Committee (LEPC) of the designated facility emergency coordinator (if such has not been submitted).

Sect. 304 - Develop format for reporting releases of hazardous chemicals, should they occur, to the National Response Center, SERC, and LEPC.

Sect. 311 - Prepare list of hazardous chemicals for which Material Safety Data Sheets are required to be maintained

Sect. 312 - Complete the "Tier I" Information forms for each category of hazardous chemicals for submittal to the SERC, LEPC, and LFD. Prepare the "Tier II" Information report for submittal, whenever requested.

Sub-Task 6 (Emergency Response Training): Develop an 8-hour Awareness and a 24-hour Operations-level emergency response training curricula suitable for Department field facilities.

Sub-Task 7 (Emergency Response Training): Provide training to individuals selected by the Department to provide training to employees at each facility.

Sub-Task 8 (Hazard Communication Standard): Develop a written Hazard Communication Program for the department and design a written Hazard Communication Program model that can be tailored to each fixed facility and temporary worksite.

Sub-Task 9 (Hazard Communication Standard): Develop an employee Hazard Communication training curriculum with variations tailored to the needs of employees at various Department worksites.

Sub-Task 10 (Hazard Communication Standard): Provide training to individuals selected by the Department to provide training to employees at each facility.

Task F: Develop a management framework that enables INDOT to comply with environmental regulations in a responsive and effective manner. At the present time, various elements of INDOT deal with hazardous materials, sometimes without benefit of a central coordinator within INDOT or contact with other appropriate state agencies. With the proper balance of a centralized clearinghouse for information and communication, and training at the various dispersed locations where INDOT has operations, the handling of hazardous materials within INDOT can be managed more effectively. The role and responsibility of the Indiana Department of Transportation for emergency planning and emergency response coordination, would also be reviewed.

II. Extension Proposal

Task G: Assist in the preparation of stormwater group permit for INDOT facilities, pursuant to recently promulgated EPA regulations.

Task H: Prepare a model Emergency Contingency Plan and Emergency Procedures to satisfy the requirements of EPA and OSHA and develop procedures for distribution, review and approval by local emergency organizations.

Task I: Conduct training for INDOT wastewater treatment plant operators.

Task J: Survey of all facilities to ascertain the volume, contents, and condition of bulk storage tanks to assess the potential for release and degradation of the environment.

Task K: Prepare a Hazardous Waste Management Guide for INDOT officials responsible for hazardous waste management in each district (an expansion of Task E, Sub-Task 1).

Task L: Assist in the preparation of a revision of INDOT Operating Procedure 20 pertaining to allowable activities of employees at the scene of a hazardous material spill or release. Also develop and propose other operating procedures relevant to this subject.

Task M: Assist in the development of facility decommissioning policies and procedures to assist INDOT in the closure of facilities to ensure that no environmental degradation will occur.

III. Expansion and Extension Proposal

Task N: Conduct a job/safety analysis, including personal and area monitoring for the following employee functions:

- herbicide mixing, application, and rinsing.
- equipment sandblasting and painting
- traffic paint mixing and transfer¹
- vehicle and equipment maintenance
- calcium chloride injection in salt piles²
- chlorine use at wastewater treatment facilities
- welding operations
- confined space entry operations at lift stations, bulk storage tanks, and highway paint truck tanks

¹Traffic painting was also assessed.

²This activity was not being performed at the time job/safety analyses were being conducted.

Note: Laboratory processes were also assessed during the second phase of site visits.

WORK PLAN

A representative sample of INDOT field facilities was selected randomly by the research staff for the initial environmental and worker protection workplace assessments. These facilities included one District, three Subdistricts, and three Unit facilities. Subsequently, the JHRP Project Advisory Committee added the Central Materials and Test Laboratory. Ms. Joyce Newland, INDOT Environmental Policy Analyst, added the Central Office Print Shop, Photogrammetry Laboratory, and the Logistical Support Center (LSC) facility. In response to invitations from field facility management personnel, four additional assessments were conducted: Greenfield District, Crawfordsville Subdistrict, Gary Subdistrict, and the Tollroad.

The schedule of workplace assessments was as follows:

August 7, 1990	Aurora Subdistrict
August 9	Frankfort Subdistrict
August 10	Wabash Unit (including Subdistrict facility)
August 13	Valparaiso Unit (including Subdistrict facility)
August 14 & 15	Vincennes District
August 15	Paxton Unit
September 6	Indianapolis Subdistrict
September 11	Central Office Print Shop and Photogrammetry Laboratory
September 11	LSC Facility
September 28	Crawfordsville Subdistrict
October 15	Greenfield District
February 14, 1991	Central Materials and Test Laboratory
July 1, 1991	Gary Subdistrict
September 23, 1991	Tollroad headquarters, tollgate, and maintenance facility

The Materials and Test Laboratories at the Vincennes and Crawfordsville facilities were also included in the initial assessments.

In addition, a meeting was held with INDOT purchasing and contracting authorities on October 23, 1990, to discuss policies and procedures for Quantity Purchase Awards (QPA) and LSC purchases and the ways in which environmental and worker protection regulations impact on such purchases.

The second phase of facility site visits was conducted by the Environmental Management and Education Program Industrial Hygiene staff in the summer/fall of 1992 for the purpose of performing a job/safety analysis, including personal and area monitoring. The schedule of industrial hygiene assessments was as follows:

July 13, 1992	Vincennes District
July 13, 1992	Centerville Rest Park
July 14, 1992	Indianapolis Subdistrict
July 14, 1992	Indianapolis Lift Station (s. side I-70)
July 16, 1992 & September 29, 1992	Fort Wayne District
July 29, 1992	Scottsburg Subdistrict
July 29, 1992 & October 7, 1992	Seymour Test Laboratory
August 25, 1992	Crawfordsville Subdistrict
August 25, 1992	Lizton Unit
September 29, 1992	Wabash Subdistrict
October 2, 1992	Central Office Print Shop
October 7, 1992	Greenfield District
October 7, 1992	Bloomington Subdistrict
July 7, 1993	Vincennes Test Laboratory

Workplace Assessment Procedure

The schedule of initial facilities to be visited for the workplace assessments was presented to the JHRP Project Advisory Committee for its review. The committee decided that facility managers should be notified in advance of the arrival of the assessment team. Dr. Corson and Ms. Newland. Concern was expressed by Dr. Corson that advance notification might influence the findings; i.e., the facilities might not appear as they would under normal operating conditions. This concern, however, was unsubstantiated. In fact, the advance notification allowed the facility management to schedule the visit on their calendar, to assemble various other supervisors and foremen to accompany the assessment team, and to formulate a plan for showing the team certain areas and operations of the facility about which they were concerned.

Because many of the field facility superintendents and managers had recently been appointed to their positions, their knowledge of the facility and its operations was often marginal, but recognizing that, such managers summoned assistance from a district engineer or facility foreman with greater knowledge of and familiarity with the facility and its operations.

The typical assessment visit began with an 8:30 a.m. meeting with the facility manager, sometimes accompanied by other management personnel. After introductions and an explanation of the purpose of the visit the team asked for a "guided tour" of the perimeter of the property.

Surface Area Assessment

The perimeter tour was intended to permit an observation of the impact of facility operations on abutting property. Drainpipes, ditches, surface grade, evidence of surface storm water runoff, by-products and materials storage practices and similar surface and "fenceline" activities were noted.

Frequently, the perimeter tour prompted the team, accompanied by facility personnel, to follow a drain or ditch off-site as its course meandered or, sometimes, directly connected to another drain or ditch, storm sewer, creek, or roadside ditch. At one location,

a surface drain was traced from the facility across county-owned property, beneath a large residential area, including two public streets, and finally emptying via a six-inch pipe into a creek almost one-half mile away from the INDOT property line.

After the perimeter tour, the remainder of the surface area was crisscrossed, at some facilities several times, and observations were made of other drains and ditches, salt storage areas (domes and sheds), salt mix areas, salt bed storage areas, vehicle and salt bed washing areas, herbicide mixing areas, paint mix areas, and other areas assigned to storage of empty drums, hazardous waste, "210" lot material, highway litter, virgin chemical and petroleum products, fence rail and sign posts, vehicle and equipment parking, aggregate piles, highway construction and maintenance material and debris, and so forth. The variety of industrial-like and construction-type activities performed at INDOT facilities and by its employees requires a large surface area with organized management of that area with boundaries (sometimes actual, sometimes imaginary) segregating one activity from another.

The surface areas of INDOT field facilities are, generally, well managed; however, there were exceptions which, to the assessment team, constituted or could constitute a violation of an environmental regulation. These situations were brought to the attention of and discussed with the facility manager. Corrective action was often recommended and, according to later reports from the field, corrective action had in many cases been implemented.

Buildings Assessment

After the surface area assessment, which usually consumed three to four hours, the assessment of operations within facility buildings commenced.

Though the representative sample of INDOT field facilities may have included a unit, subdistrict, or district facility at one geographic location, when two or three facilities shared a common geographic location both or all three facilities were assessed.

In some geographic locations the sharing of surface area and buildings by a unit and/or subdistrict and/or with a district facility proved to complicate the assessment. And in some locations the sharing of "space", in the opinion of the assessment team, proved to

complicate the organization and management of strategies to effectuate compliance with environmental regulations. This matter will be addressed more thoroughly in the Observations and Findings section of the report included as Attachment 1: however, this demarcation of one facility's "space" from another, by physical or imaginary boundaries, needs to be clarified via department policies.

Operations within buildings were observed and every building, garage, bay, and storage shed at each location was visited. The sign shops, bead rooms, district shops, QPA buildings, paint rooms, crew areas, crew equipment rooms, unit buildings, herbicide storage areas, pump (gasoline) houses, weld shops, vehicle wash bays, buildings and grounds rooms, open storage bays, and other such designated areas, wherever they existed, were assessed.

The foreman or supervisor of each area or activity using that area usually described the operations as the walking tour proceeded, visiting at various work stations and talking with employees performing various tasks. Whereas the surface area assessment was principally environmental in nature, the buildings assessment was primarily to access workplace and chemical hazards and employee safety and health protection, although at many locations the activity inside the building significantly impacted the environment outside the building (e.g., vehicle washing, degreasing operations, used oil collection, etc.)

Assessments of operations in and near to buildings included the storage, use, and disposal of chemical and petroleum products; the proper labeling of containers, the maintenance and ready accessibility of Material Safety Data Sheets, the safe performance of various tasks, such as welding, changing steel-rimmed tires, vehicle spray painting and equipment sandblasting, herbicide mixing, traffic paint mixing and transfer, and so forth.

At the conclusion of the buildings assessment the assessment team and, usually, the facility superintendent returned to his office so the team could interview the manager using the Workplace Assessment Questionnaire. (See Appendix A to Attachment 1.)

The administration of the Workplace Assessment Questionnaire, a 14-page, 64-question document, allowed the team to clarify its observations and probe further into specific issues revealed during the assessment. This interview also provided the opportunity

for the manager to ask questions of the team about the assessment and, at some facilities, managers sought advice about how to address certain issues.

The interview usually concluded about 5:00 p.m., whereupon the two team members would meet to discuss observations, compare notes, and voluntarily undertake assignments to obtain additional information requested by the facility manager or to seek clarification of an issue through contact with an Indiana or federal environmental or safety and health agency.

Industrial Hygiene Assessment Procedures

The schedule of site visits was arranged by Calvin Lee, INDOT Safety Director. Mr. Lee placed numerous telephone calls to a variety of facilities to ascertain when certain employee functions would be performed. The variety of activities performed by any field crew and the seasonal nature of many of these activities required frequent adjustments to the schedule and the facilities to be visited.

Mr. Lee was accompanied by Ms. Cheryl Lindsey, Industrial Hygienist with the Environmental Management and Education Program, on site visits conducted between July 13 and October 7, 1992.

Upon arrival at the facility, inquiry would be made by Lee/Lindsey as to whether the employee function they were there to observe and assess was being performed. If it was, the assessment would be conducted; if not, other functions would be observed and workplace safety and health measures evaluated. If time permitted, other functions would be observed after the assessment of the primary function was completed.

Ms. Lindsey transported a variety of air and noise monitoring equipment to each site. Air and noise sampling was conducted in various work areas and personal monitoring was conducted of employees performing the tasks which were the focus of this portion of the study.

Accomplishment of Work Plan Objectives

The accomplishment of the various work tasks specified at the beginning of the report section required the allocation of considerable staff and other resources from the Environmental Management and Education Program. The remainder of this report section describes how the tasks were accomplished and the product or results of those efforts.

Tasks A-D: The period from March to May 1990 involved developing, testing and revising the INDOT Facility Environmental and Employee Protection Audit Questionnaire to be used for interviewing facility managers during the workplace assessment visits. The initial environmental and worker protection workplace assessments were conducted in August, September, and October of 1990. The assessment of the Central Materials and Test Laboratory was conducted in February, 1991. The Report of these assessments was provided to the project advisory committee on June 11, 1991 (Part I: Environmental Compliance Issues) and September 1991 (Part II: Occupational Safety and Health Issues).

Task E, Sub-Tasks 1, 2, and 3: The completion of these sub-tasks, together with Task K, has been delayed as resources were focused on Task H, the preparation of the model Emergency Contingency Response Plan, which has recently been completed and reviewed with Ms. Newland, Mr. Lee, and the District Environmental Coordinators and Safety Coordinators. The completion of the Plan is necessary to the finalization of the above sub-tasks. A commitment has been made to INDOT to complete the sub-tasks as expeditiously as possible.

Task E, Sub-Task 4: A pollution prevention audit of the Frankfort Subdistrict was completed in March 1992. A copy of the audit report is enclosed here as Attachment 3.

Task E, Sub-Task 5: Community Right-To-Know documents were prepared for a "typical district", incorporating information from Material Safety Data Sheets provided by the LaPorte District facility and information from MSDSs for herbicides stored at other facilities. (See Attachment 4.) A computerized list of the Material Safety Data Sheets and

the Inventory List of Hazardous Substances was provided to Joyce Newland on March 19, 1991. CRTK Reports for Sections 302, 303, 304, 311 and 312 were provided for "Typical District-LaPorte" on February 7, 1992.

The original intent was to use the reports as a model to encourage reporting by all district and subdistrict facilities. EMEP agreed to compile MSDS information and print model reports for one or two subdistricts and to determine if reporting by units was required. Soon after the reports were provided, an INDOT official solicited and received a written opinion from the Indiana Department of Environmental Management (IDEM) that section 311 and 312 reports were not required from public employers because public employers are excluded from federal OSHA law. IDEM solicited its opinion from a federal OSHA attorney who informed an EPA attorney that public employers were exempt. EPA staff disagree with the opinion, so does this report's author, because the CRTK regulations make no distinction between public and private employers. INDOT officials concur with the opinion, but will make every effort to "voluntarily comply".

Task E. Sub-Tasks 6 and 7: The 8-hour Awareness and 24-hour Emergency Response Operations-level training curricula were developed. Below is the schedule of emergency response training courses conducted and the number of INDOT employees attending.

November 19, 1991	Awareness	16
November 20-22, 1991	Operations	15
May 12, 1992	Awareness	19
May 13-15, 1992	Operations	15
May 19, 1992	Awareness	29
May 20-22, 1992	Operations	25
October 21-23, 1992	Operations	15
	Total	134

Task E, Sub-Task 8: The model written Hazard Communication Program was provided to Joyce Newland on March 12, 1991. A copy is included here as Attachment 5.

Task E, Sub-Task 9 and 10: The Hazard Communication training curriculum was developed and used to train INDOT Safety Coordinators and others who has been selected to be trained as trainers. The curriculum is included here as Attachment 6. Hazard Communication Train-the-Trainer session were conducted November 18, 1991, March 16 and May 18, 1992 with 16, 19, and 29 INDOT employees (64 total) participating, respectively.

Task F: The "management framework" was proposed at a meeting of the INDOT Executive Staff (Commissioner and Deputy Commissioners) on August 9, 1991. After the presentation of a proposed management framework, and during the discussion of the proposal, Deputy Commissioner Novreske stated that it was not appropriate for the JHRP report to recommend the organizational change proposed. The proposal was not discussed further.

Task G: The development of the INDOT Storm Water Group Permit Application required hours of investigation and analysis of the EPA regulation requirements because it wasn't clearly evident, at first, that INDOT was required to complete an application. Subsequent council from three engineering firms, two environmental law firms, and the permitting authority in the Indiana Department of Environmental Management, all of whom agreed INDOT was not exempted, prompted additional work in preparing the application which was submitted by Joyce Newland to EPA on September 30, 1991. On January 6, 1992 a letter was received from EPA stating that INDOT was excluded from the requirements because, as a public agency, its Standard Industrial Classification (SIC) Code was not one of those subject to the regulation.

Task H: The model emergency contingency/response plan was developed and a draft of the document conveyed to Joyce Newland on October 6, 1992, and the same is included here as Attachment 7. The proposed Plan was reviewed at a meeting November 5, 1992 with Newland, Lee, and INDOT Environmental Coordinators and Safety

Coordinators. A second meeting will be scheduled to complete the review and make any necessary revisions.

Task I: On June 15, 1992 a meeting of Joyce Newland and other INDOT representatives, Indiana Water Pollution Control Association officials, and JHRP project staff was held to discuss plans for wastewater treatment plan operator training. It was revealed at the meeting that training of operators had begun under the auspices of another INDOT division. Neither Ms. Newland or the JHRP project staff were aware of that activity. The training program uses videotaped courses which had been produced by Purdue EMEP and the IWPCA and broadcast over the Indiana Higher Education Telecommunications System in 1991.

Task J: A survey of chemical and petroleum bulk storage at INDOT facilities was initiated through Joyce Newland on January 30, 1992. The results of the survey, returned to the research staff on March 3, were entered in a computer and formatted for printing using different variables, one of which is included here as Attachment 8.

Task K: (see discussion Task E, Sub-Tasks 1, 2 and 3)

Task L: INDOT Operating Procedure 20, pertaining to allowable activities of employees at the scene of a highway hazardous materials spill, was conveyed to Joyce Newland on January 16, 1992. It was slightly modified by INDOT staff and was issued as policy approved by Deputy Commissioner Schoener on February 18, 1992. A copy is included here as Attachment 9.

Task M: The need for an orderly and thorough INDOT facility decommissioning policy and procedures is apparent to one who has visited the "old" Wabash subdistrict facility. (See Attachment 1, Part 1, page 57.) Information was sought from the Defense Contracting Services Agency and the General Services Administration. Both agencies were revising their policies and procedures to conform to the "Superfund" law site remediation requirements. Subsequent telephone calls to these agencies revealed that revisions were "still in process".

Task N: The Report of Industrial Hygiene Assessments at INDOT Field and Support Facilities is included here as Attachment 2.

Other Tasks Performed: On March 8, 1991 EMEP's Industrial Hygienist, Cheryl Lindsey, conducted a workplace assessment of the Central Materials and Test Laboratory with Robert Lowry. The report of the assessment and recommendations was conveyed to Joyce Newland on May 1, 1991. That report is included here as Attachment 10. Ms. Lindsey repeated the workplace assessment on October 2, 1991 with Todd Tracy (after Mr. Lowry's death) and subsequently prepared a Chemical Hygiene Plan for the Laboratory. Such a plan is required by the OSHA Occupational Exposures to Hazardous Chemicals in Laboratories Standard, 29 CFR 1910.1450. A copy of that Plan is included here as Attachment 11.

At the request of Calvin Lee, Cheryl Lindsey visited the I-65/US2 Lowell Weigh Station (southbound lane) in March 1991 to take samples of material suspected to contain asbestos. Laboratory analysis revealed no asbestos was present.

At the request of Calvin Lee on January 23, 1992, a model written Hazard Communication Program and Respiratory Protection Program were developed and provided for INDOT use.

Training required by the Laboratory Standard was delivered by Cheryl Lindsey to approximately 125 Materials and Test Laboratory employees on April 22-23, 1992³.

³ A total of 323 INDOT employees were trained by the Environmental Management and Education Program in emergency response, hazard communication or the laboratory standard during the course of this project.

RECOMMENDATIONS

The recommendations resulting from the environmental and worker protection workplace assessments and the industrial hygiene workplace assessments are included here as Attachments 1 and 2.

The industrial hygiene assessment was completed in October 1992 and was only recently reviewed by INDOT officials. The findings, below, are specific to the samples taken and cannot be extrapolated to all similar work environments. The findings are significant, however, and suggest that monitoring be conducted at all INDOT facilities that perform the same tasks. The industrial hygiene monitoring revealed that INDOT employees sampled have-

- an overexposure to lead during equipment painting operations
- an overexposure to paint solvents during equipment painting operations
- an overexposure to total dust during sandblasting operations
- a potential overexposure to noise during sandblasting operations
- a potential overexposure to noise during equipment painting operations
- a potential overexposure to noise during some vehicle equipment and maintenance activities
- a potential overexposure to hydrocarbons during the asphalt extraction process performed in test laboratories

SUGGESTIONS FOR IMPLEMENTATION

The project recommendations contained in Part I of the INDOT Facilities Workplace Assessment Report (Attachment 1) contributed to many of the decisions by agency administrators in the last two years to review department policies, procedures, purchasing procedures, and work practices, including: hazardous waste management and waste transportation contracting; waste solvent management and contracting; waste oil and oil filter management and contracting; salt storage and stormwater abatement; traffic paint bulk container purchase and bulk storage; herbicide application procedures and contracting alternatives; sewage treatment plant operator training; emergency response procedures and training, and hazard communication trainer training, among other topics.

About five weeks after the Executive Staff meeting of August 9, 1991 at which the project researcher and Joyce Newland reported on the findings of the workplace assessments, the Commissioner and Deputy Commissioner for Operations visited various INDOT facilities looking at environmental items--salt run-off, storing of fuels and solvents, disposal procedures, storing paints, etc. Following the site visits, the Commissioner delegated responsibility to the Operations Division for leading the environmental cleanup effort. At the Commissioner's direction, each district director appointed one of his operations' employees as the environmental specialist (now coordinator). Each director was also instructed to select one subdistrict to be the environmental "showcase" for the district and the facility where environmental pilot projects are tested. This action by the Commissioner and Deputy resulted in the identification of a position in the Operations Division to serve as the focus for environmental coordination. The Commissioner also agreed to direct INDOT budget officials to look for additional dollars to help with this effort.

The initiatives of two years ago implemented by INDOT Executive Staff have, for the most part, been sustained primarily because of the commitment and effectiveness of the district environmental coordinators. The department has made incredible progress toward

achieving compliance with environmental regulations and with the establishment of the Environmental Division in August 1993, more progress is anticipated.

As regards INDOT's occupational safety and health program: equal attention needs to be focused there. Employees, most of whom are classified as Laborers or Maintenance Worker III, perform tasks such as spray painting, sandblasting, herbicide spraying, paint/solvent mixing and similar functions with little knowledge of the human health and safety or environmental hazards inherent in these functions.

The Employee Safety Procedures Handbook fails to address many of the more hazardous tasks performed by employees and it offers incomplete guidance and cautions for those tasks it does address.

The provision of personal protective equipment (respirators, protective clothing, hard hats, protective eyewear, splash goggles, etc.) to employees is not uniform throughout the state. The acquisition of this equipment by district directors appears to be voluntary. And from observations of the workforce at many facilities, one would conclude that the wearing of personal protective equipment is most certainly voluntary.

The distinction between safety and health policy and safety and health recommendations is best exemplified by the INDOT Employee Safety Procedures Handbook repeated use of the word "should", as in "employees should wear gloves". The word "should" is advisory and permissive and non-binding. The word "should" should be replaced with the word "shall" in any policy, directive, or manual concerning employee safety.

The position of Safety Director should be strengthened but, first, the Executive Staff needs to elevate the issue of employee health and safety to one of priority on the list of management concerns. The same vigor that spawned the "new environmental initiative" a year ago needs to be applied here.

This research report has emphasized compliance with federal and state environmental and worker protection regulations. But the greater concern, certainly shared

by INDOT administrators, is the protection of the environment and the protection of worker health and safety, sans regulations.

The Indiana Department of Transportation, unlike any other state government entity, resembles a manufacturing operation in that chemicals are used to produce products that are integral to highway maintenance or are applied to highways after construction. The chemicals used to maintain and repair its vast vehicle and equipment inventory are as much a source of potential employee health or physical hazard and environmental contamination as are the chemical constituents of asphalt and paint. Like a construction company, a painting contractor, and a vehicle maintenance firm, the Department of Transportation needs to adopt a comprehensive compliance strategy to reduce the actual and perceived risks to its employees, community residents, and the Indiana environment.

ATTACHMENT 1

INDOT Facilities Workplace Assessment of Environmental & Worker Protection Based on Observations at Various INDOT Field & Support Facilities

Part I: Environmental Compliance Issues

Part II: Occupational Health & Safety Compliance Issues

FINAL REPORT
TO THE
JHRP ADVISORY COMMITTEE

INDOT FACILITIES WORKPLACE ASSESSMENT
OF ENVIRONMENTAL AND WORKER PROTECTION
BASED ON OBSERVATIONS AT
VARIOUS INDOT FIELD AND SUPPORT FACILITIES

PART I: ENVIRONMENTAL COMPLIANCE ISSUES
PART II: OCCUPATIONAL HEALTH & SAFETY COMPLIANCE ISSUES

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INDOT FACILITIES WORKPLACE ASSESSMENT OF ENVIRONMENTAL AND WORKER PROTECTION

INTRODUCTION

The JHRP proposal stipulated that the Contractor would perform workplace assessments of facilities "to examine the physical facilities, operations, procedures and policies with respect to the requirements of each of the five regulatory and program parameters," referenced in the proposal, namely:

- Resource Conservation and Recovery Act (RCRA) Regulations (40 CFR 264 and 265) pertaining to management of hazardous waste.
- EPA Pollution Prevention Initiative Program [now, the Pollution Prevention Act of 1990¹] pertaining to the prevention of pollution through reducing or eliminating discharges and/or emissions to the environment.
- Superfund Amendments and Reauthorization Act of 1986 (SARA), Title III Emergency Planning and Community Right-To-Know Act of 1986 and the regulations promulgated thereto (40 CFR Parts 350, 355, 370 and 372) pertaining to the development of an emergency contingency plan for the facility and the annual reporting of certain chemicals at the facility which exceed specified threshold amounts to the local Emergency Planning Committee and the State Emergency Response Committee.
- Hazardous Waste Operations and Emergency Response Rule (29 CFR 1910.120). A U.S. Occupational Safety and Health Administration (OSHA) regulation, adopted by the Indiana OSHA, requiring employers to provide safety and health training to employees required or who will volunteer to respond to spills and releases of hazardous chemicals.
- Hazard Communication Standard (29 CFR 1910.1200). A U.S. Occupational Safety and Health Administration (OSHA) regulation, adopted by Indiana

¹HR5835, Title VI. Budget Reconciliation Act.

OSHA, requiring employers to develop a written Hazard Communication Program and provide information and training to employees about the hazards of chemicals in the workplace.

A representative sample of INDOT field facilities was selected randomly by the Contractor. These facilities included one District, three Sub-districts, and three Unit facilities. Subsequently, the JHRP Project Advisory Committee added the Central Materials and Test Laboratory. Ms. Newland, Environmental Policy Analyst, INDOT added the Central Office Print Shop, Photogrammetry Laboratory, and the Logistical Support Center (LSC) facility. In response to invitations from field facility management personnel, two additional assessments were conducted: Greenfield District and the Crawfordsville Sub-district.

The schedule of workplace assessments was as follows:

August 7, 1990	Aurora Sub-district
August 9	Frankfort Sub-district
August 10	Wabash Unit (including Sub-district facility)
August 13	Valparaiso Unit (including Sub-district facility)
August 14 & 15	Vincennes District
August 15	Paxton Unit
September 6	Indianapolis Sub-district
September 11	Central Office Print Shop and Photogrammetry Laboratory
September 11	LSC Facility
September 28	Crawfordsville Sub-district
October 15	Greenfield District
February 14, 1991	Central Materials and Test Laboratory

The Materials and Test Laboratories at the Vincennes and Crawfordsville facilities were included in the assessments.

In addition, a meeting was held with INDOT purchasing and contracting authorities on October 23, 1990, to discuss policies and procedures for Quantity Purchase Awards (QPA) and (LSC) purchases and the ways in which environmental and worker protection regulations impact on such purchases.

ASSESSMENT PROCEDURE

The schedule of initial facilities to be visited was presented to the JHRP Project Advisory Committee for its review. The committee decided that facility managers should be notified in advance of the arrival of the assessment team, Dr. Corson and Ms. Newland. Concern was expressed by Dr. Corson that advance notification might influence the findings; i.e., the facilities might not appear as they would under normal operating conditions. This concern, however, was unsubstantiated. In fact, the advance notification allowed the facility management to schedule the visit on their calendar, to assemble various other supervisors and foremen to accompany the assessment team, and to formulate a plan for showing the team certain areas and operations of the facility about which they were concerned.

Because many of the field facility superintendents and managers had recently been appointed to their positions, their knowledge of the facility and its operations was often marginal, but recognizing that, such managers summoned assistance from a district engineer or facility foreman with greater knowledge of and familiarity with the facility and its operations.

The typical assessment visit began at 8:30 a.m. with a meeting with the facility manager, sometimes accompanied by other management personnel. After introductions and an explanation of the purpose of the visit the team asked for a "guided tour" of the perimeter of the property.

Surface Area Assessment

The perimeter tour was intended to permit an observation of the impact of facility operations on abutting property. Drainpipes, ditches, surface grade, evidence of surface storm water runoff, by-products and materials storage practices and similar surface and "fenceline" activities were noted.

Frequently, the perimeter tour prompted the team, accompanied by facility personnel, to follow a drain or ditch off-site as its course meandered or, sometimes, directly

connected to another drain or ditch, storm sewer, creek, or roadside ditch. At one location, a surface drain was traced from the facility across county-owned property, beneath a large residential area, including two public streets, and finally emptying via a six-inch pipe into a creek almost one-half mile away from the property line.

After the perimeter tour, the remainder of the surface area was crisscrossed, at some facilities several times, and observations were made of other drains and ditches, salt storage areas (domes and sheds), salt mix areas, salt bed storage areas, vehicle and salt bed washing areas, herbicide mixing areas, paint mix areas, and other areas assigned to storage of empty drums, hazardous waste, "210" lot material, highway litter, virgin chemical and petroleum products, fence rail and sign posts, vehicle and equipment parking, aggregate piles, highway construction and maintenance material and debris, and so forth. The variety of industrial-like and construction-type activities performed at INDOT facilities and by its employees requires a large surface area with organized management of that area with boundaries (sometimes actual, sometimes imaginary) segregating one activity from another.

The surface areas of INDOT field facilities are, generally, well managed; however, there were exceptions which, to the assessment team, constituted or could constitute a violation of an environmental regulation. These situations were brought to the attention of and discussed with the facility manager. Corrective action was often recommended and, according to later reports from the field, corrective action had in many cases been implemented.

Buildings Assessment

After the surface area assessment, which usually consumed three to four hours, the assessment of operations within facility buildings commenced.

Though the representative sample of INDOT field facilities may have included a unit, sub-district, or district facility at one geographic location, when two or three facilities shared a common geographic location both or all three facilities were assessed.

In some geographic locations the sharing of surface area and buildings by a unit and/or sub-district and/or with a district facility proved to complicate the assessment. And in some locations the sharing of "space", in the opinion of the assessment team, proved to complicate the organization and management of strategies to effectuate compliance with environmental regulations. This matter will be addressed more thoroughly in the Observations and Findings section of this report; however, this demarcation of one facility's "space" from another, by physical or imaginary boundaries, needs to be clarified via department policies.

Operations within buildings were observed and every building, garage, bay, and storage shed at each location was visited. The sign shops, bead rooms, district shops, QPA buildings, paint rooms, crew areas, crew equipment rooms, unit buildings, herbicide storage areas, pump (gasoline) houses, weld shops, vehicle wash bays, buildings and grounds rooms, open storage bays, and other such designated areas, wherever they existed, were assessed.

The foreman or supervisor of each area or activity utilizing that area usually described the operations as the walking tour proceeded, visiting at various work stations and talking with employees performing various tasks. Whereas the surface area assessment was principally environmental in nature, the buildings assessment was primarily to assess workplace and chemical hazards and employee safety and health protection, although at many locations the activity inside the building significantly impacted the environment outside the building (e.g., vehicle washing, degreasing operations, used oil collection, etc.)

Assessments of operations in and near to buildings included the storage, use, and disposal of chemical and petroleum products; the proper labeling of containers, the maintenance and ready accessibility of Material Safety Data Sheets, the safe performance of various tasks, such as welding, changing steel-rimmed tires, vehicle spray painting and equipment sandblasting, herbicide mixing, traffic paint mixing and transfer, and so forth.

At the conclusion of the buildings assessment the assessment team and, usually, the facility superintendent returned to his office so the team could interview the manager using the Workplace Assessment Questionnaire (see Appendix A.)

The administration of the Workplace Assessment Questionnaire, a 14-page, 64-question document, allowed the team to clarify its observations and probe further into specific issues revealed during the assessment. This interview also provided the opportunity for the manager to ask questions of the team about the assessment and, at some facilities, managers sought advice about how to address certain issues.

The interview usually concluded about 5:00 p.m., whereupon the two team members would meet to discuss observations, compare notes, and voluntarily undertake assignments to obtain additional information requested by the facility manager or to seek clarification of an issue through contact with an Indiana or federal environmental or safety and health agency.

PART I

**RECOMMENDATIONS OF POLICY AND/OR PROCEDURES REGARDING
ENVIRONMENTAL COMPLIANCE ISSUES**

The recommendations for amelioration or remediation of a problem are ordered according to the frequency of an observed problem and the severity of the problem as regards compliance or lack of compliance with state and/or federal environmental regulations.

Recommendations of Policy and/or Procedure Regarding Operations Involving Salt

1. At a minimum, INDOT should modify Operating Procedure No. 22 with a correction of the maximum chloride concentration level and an explanation of the lower concentration level outside the mixing area. Effluent samples should be collected at all facilities on peak activity days during the "salt season" to determine the actual level of chloride concentration in the outfall.

2. Investigations should be made of the feasibility and cost of connecting INDOT facilities to city sewer systems so as to (1) better manage and treat salt run-off or (2) obviate the need for an NPDES storm water permit.

3. INDOT should issue a policy prohibiting any discharge of salt brine from facilities to ditches, creeks, and streams. A collection system, of the type recommended in Operating Procedure No. 22, is satisfactory; however, rather than permitting overflow or diversion, the department should investigate the feasibility of contracting with one or more firms to pump-out the salt brine from these holding tanks for discharge to amenable city sewer systems for those facilities where connection to a city sewer system is not feasible or is too costly.

Recommendation of Policy and/or Procedure Regarding Salt Bed, Vehicle and Equipment Sandblasting and Painting

1. INDOT should stipulate in all future purchase orders that vehicle and equipment primer and paint containing lead or lead compounds will not be accepted.

2. An inventory of remaining stocks of lead-based vehicle primer and paint should be conducted at each INDOT facility.

3. Remaining inventories of lead-based primer and paint, if too large to be collected and discarded, should only be applied to vehicles and equipment which will not, in the future, be sandblasted for repainting at INDOT facilities.

4. Just as the department has a policy requiring contractors to collect sandblast grit and lead-based paint from bridge maintenance and repainting work to be disposed as hazardous waste, so, too, should INDOT promulgate a policy requiring the clean-up of the surface beneath salt bed racks and other areas where lead-based paint has been sandblasted so it can be properly disposed.

5. Vehicle and equipment sandblasting and repainting is performed by inmates at correctional institutions for some INDOT facilities. The department should advise the Indiana Department of Correction of the steps it is taking to ameliorate the environmental hazards resulting from such activity. [The safety and health hazards of this activity are discussed in Part II of this report.]

6. Sandblasting and painting operations, even with alkyd resin paints, present environmental and employee health and safety hazards. The department should designate at least one facility in each district to sandblast and repaint equipment, including salt beds, for that district. A modern facility like the paint room at the Wabash sub-district should be constructed at the designated facility and one or more full-time painters should be employed to perform the tasks. Employees should be properly classified in other than a Maintenance Worker position and should receive training concerning proper procedures necessary to reduce the risks to their safety and health and to the environment. Used grit and paint products should be properly managed as hazardous or special wastes by these designated painting facilities.

Recommendation of Policy and/or Procedure Regarding Vehicle and Equipment Washing and Clean-Out

1. Vehicle and equipment washing and clean-out operations should be restricted to one or more areas (pads) specifically designated (with signs posted) for these purposes. Outside (surface) areas should be constructed so that run-off is captured for discharge to a city sewer system or in a catch basin which is later pumped out and transported for discharge to a city sewer system. Preferably, such pads would be constructed of concrete to reduce the potential for sub-soil and groundwater contamination. Vehicle wash bays should be constructed with a similar collection system and a drain interconnecting with the city sewer system or the catch basin.

2. Until such facilities are constructed, the Department should sample and analyze the contaminant content of the various seasonal pad "mixtures" to determine if they need to be managed as hazardous or special waste.

Recommendation of Policy and/or Procedure Regarding Herbicide Mixing and Tank Rinsing

1. The department should analyze the costs and benefits of continuing to utilize its employees, equipment, and facilities for herbicide spraying operations versus contracting all of this activity to other sources.

2. If the decision is made to retain some of the spraying operation, the department should, as an interim measure, issue a policy requiring the construction of a temporary containment area or designation of an existing, contained wash-out area at each facility for the mixing and loading of herbicides. The containment or wash-out area should have a catch basin to capture spills or tank wash solutions which can be pumped and properly discharged to a city sewer system.

3. If the spraying operation is to be retained, the department should design an operational area containment pad to conform to the Office of State Chemist rules and allocate funds for the construction of such pads at each facility where mixing and load-out

occurs, regardless whether the stored bulk quantities of pesticide meet the minimum amounts required by the rules for such construction.

Recommendation of Policy and/or Procedure Regarding Traffic Paint Mixing and Loading

1. Paint mixing and loading should be confined to a designated bermed area with an asphalt surface large enough to accommodate the paint truck, the drums being mixed and pumped, and the drums of toluene used for soaking transfer hoses. The area should have a separate catch basin with a capacity to hold a spill of at least two 55-gallon drums. The berm should be low enough to permit the ingress and egress of the paint truck yet high enough to capture spills on the surface before they drain to the catch basin. This berm would also protect drums being used and the toluene drums from being struck by other vehicles during the absence of the paint truck and crew. As it is, now, the drums are often in or near traffic flow around the Sign Shop or Paint Shop and could be struck and tipped over releasing their contents.

Given that the paint mixing and transfer operations is similar to the herbicide mixing and transfer operations, in that a designated bermed area would capture unintentional spills (unlike salt bed and vehicle wash-out areas designed to capture intentionally caused effluent) the two operations conceivably could share the area.

Catch basins for paint mixing-loading areas should be designed with a gate to divert the collection of storm water to the facility's larger effluent holding tank or, preferably, to the city sewer system. The gate would be closed by spray crews or paint crews upon entering the area and opened again upon leaving the area.

2. Paint transfer line flushing should be done while the hose is still attached to the paint truck, unless the small quantity of solvent would affect the drying characteristics of the paint. The hose should then be hung on a rack for drying with each end over a drum to collect any residue. This procedure, if feasible, would reduce the mixed toluene/paint wastestream considerably and also eliminate the potential for a spill of the drum's contents.

3. Existing paint mixing and loading area surfaces at all facilities should be cleaned with a Bartel grinder and the debris containerized and disposed of as a hazardous or special waste. This would improve, measurably, the appearance of these areas and also reduce the potential for contamination of run-off from weathering and vehicle traffic wear.

Recommendation for Policy and/or Procedure Regarding Chemical and Petroleum Product and Hazardous Waste Storage

1. Chemical and petroleum products in 5 to 55 gallon containers should be properly managed according to a storage plan which designates specified areas at the facility, perhaps according to activity (e.g.; spraying, vehicle painting, highway painting, etc.).

Herbicide containers should be segregated in a locked storage area with a sign conspicuously posted on the door identifying the containers stored therein.

Traffic paint and solvents should be segregated and may be stored in a remote location on the surface; however, neither product should be stored over two pallets high and the storage area should be roped-off to prevent vehicular trespass, or better, separated from traffic flow by parking space "bumpers", if such would not interfere with paint crew operations.

Chemical and petroleum products used in vehicle maintenance operations should be stored indoors in a designated area. "Working" containers, those being used by employees in the shop from which contents are transferred to smaller containers by hand or electric drum pump or by bung valve, should be segregated in the shop or an adjacent area. The potential for environmental contamination (and human health exposure) as a result of a spill from a "working drum" can be minimized if such containers are confined within a bermed area with a volume capacity of twice the largest container.

2. The department should initiate a survey of all facilities to assess the environmental vulnerability to releases of bulk storage tank contents. The department should require all such tanks to be pressure-tested and inspected by a contracted tank expert. Facilities should identify such tank contents and their locations on a current facility

blueprint and show the distance of any bulk tanks to the perimeter of the property, to the nearest catch basin, and to other drains and ditches. If the content of any full bulk storage container cannot be captured in existing catch basins and surface containment areas. INDOT should require the construction of secondary containment around existing tanks and all future installations. Existing state laws require secondary containment of bulk petroleum products and agricultural fertilizers and pesticides. Though neither law would require secondary containment of calcium chloride, department officials would be wise to treat this storage practice as if such a requirement did exist.

3. The six INDOT district facilities are large quantity (over 2200 pounds per month) hazardous waste generators or bordering on that classification. And with the termination of hazardous waste transportation from sub-districts and units to the district facility, all sub-districts and a few units will become small quantity (220 to 2200 pounds per month) hazardous waste generators. The few remaining units will be classified as conditionally exempt (less than 220 pounds per month) generators.

The U.S. EPA and Indiana Department of Environmental Management regulations prescribe the type of hazardous waste storage required of each category of generator.

The department should issue a policy requiring each of its facilities within the three categories to construct the appropriate storage facility providing for waste segregation from virgin chemical product and other facility activity and for the capture of spilled or released waste material from the storage area.

Recommendation for Policy and/or Procedure Regarding Storage of Impounded and Abandoned Vehicles at INDOT Facilities

1. The department should initiate discussions with, primarily, the Indiana State Police to investigate whether there exist options to the current practice of using INDOT facilities for the temporary storage of impounded and abandoned vehicles.

Lacking any other convenient and secure areas (e.g., privately-owned salvage yards) for law enforcement agencies, the department should establish a policy and issue

procedures whereby a vehicle to be stored will, first, be checked thoroughly for any hazardous cargo. If a hazardous cargo is being carried, the facility manager shall obtain a certificate from the officers that the cargo is safely containerized and stored. A visual inspection by INDOT employees would also be appropriate.

The law enforcement officers should be required to sign a record of impoundment or storage, identifying themselves, their agency or post, and telephone number. The order for impoundment or storage should be for a time certain; e.g., not to exceed 30 days.

INDOT employees, with the law enforcement officers present, should inspect the integrity of the fuel tanks and fuel lines: a freight van truck ("18-wheeler") is capable of carrying upwards of 150 gallons of fuel, more than enough to cause environmental degradation if released.

2. Bulk cargo tankers of hazardous materials or waste and certain non-hazardous commodities, such as vinegar (acetic acid) and soybean oil, should not be permitted to be stored at INDOT facilities without a certificate of road worthiness signed by an Indiana State Police motor carrier officer. This road worthiness inspection should include the integrity of the tank, the condition of internal and external valves, and lines. After the inspection, all valves and domes should be closed and locked and the keys left with the facility manager.

Recommendation of Policy and/or Procedure Regarding Temporary Storage of "Abandoned" Hazardous Waste at INDOT Facilities

1. The department should immediately issue a policy instructing facility managers to deny permission requested by environmental contractors (even those contracted to INDOT), the Indiana Department of Environmental Management, the Indiana State Police or any other agency or person, to store known, unknown, or suspected hazardous waste and waste contaminated soil at INDOT facilities.

Should other state agencies argue for their "right" to store such abandoned material on state property -- the conveniently located INDOT facilities -- the department should

reply with a proposal that those agencies must assume responsibility for designing and constructing a proper state-permitted storage facility; that those agencies will indemnify INDOT of any personal or environmental liability in the event of a release or other occurrence, and that the management and maintenance of such facilities be wholly the responsibility of the other agencies.

One can argue that a state such as "heartland" Indiana, at the cross-roads of the country, is going to find some abandoned hazardous waste and that there will be recovery of hazardous materials and contaminated soil by emergency response contractors directed to the incident scene by ISP and/or IDEM.

One may also argue that not all emergency response contractors are hazardous waste transporters and permitted treatment, storage, and disposal facilities and that temporary storage sites are necessary so that the paperwork for the "shipment" and the shipment, itself, can be transferred from one entity to another. Such transactions and transfer are not facilitated by environmental protection regulations and the insurance costs and potential liability make all parties to such transactions somewhat "gun-shy".

Without firm commitments from others, as described above, INDOT should stay out of the "abandoned" hazardous waste storage business.

Recommendation of Policy and/or Procedure Regarding Management of Traffic Paint and Solvent Products and Containers

The contracts for the 1991 traffic paint supply have been awarded, and the invitations to bid on drum pick-up have been posted. but policies and procedures need to be established now for 1992.

1. One option that has been discussed previously is to award the traffic paint contract only to a vendor willing to ship and retrieve its product in returnable drums. This presumably satisfies the drum pick-up scheduling problem and the "empty" when empty and environmental degradation issue, assuming that the vendor doesn't contract with a barrel reclaimer to pick-up the drums.

2. A second option discussed recently is to require vendors to ship paint product in 300 gallon (or some similarly-sized) bulk storage tote. Some totes used by paint manufacturers are aluminum or plastic returnable containers and others, incredibly, are large reinforced cardboard boxes with a plastic liner, mounted on a wood or reinforced cardboard 4x4 foot pallet. The box, the liner and the pallet are disposable. Totes can be stacked two high and, fitted with a top or side bung, can be "worked" as stacked by gravity feed or vacuum. The top tote when emptied can be lifted from the bottom tote by two men and disassembled for disposal or cardboard recycling. Gravity feed from the side-near-bottom bung allows drainage by tipping as the plastic liner closes in on itself with the weight of the paint escaping through the bung. Plastic liners with a paint residue will probably still be considered as a hazardous or special waste, if the equivalent of 1 inch or more remains: however, many of them can be stored in a drum for shipment off-site.

3. All chemical and petroleum product containers should be marked at the facility with the date of receipt so that products received first are used first. Some of the containers littering the facility have been stacked in these out-of-the-way locations because the expiration date ("shelf life") of the product was exceeded, or the container was held so long the label faded or fell off or, upon opening, it was discovered that the product had hardened, separated, congealed, and was no longer useable. Some of the waste is created because the product was experimental (Formulation EF 689 Starane herbicide), didn't work ("holeplug"), or was replaced with another less hazardous product (methylene chloride).

4. A policy should be issued to all facility managers directing that the small containers of waste chemical and petroleum product, especially paint, be consolidated by type of waste in larger containers and managed as hazardous or special waste.

Recommendation of Policy and/or Procedure Regarding Petroleum Product Purchases and Recycling

1. The variety of purchasing procedures utilized by one facility is replicated throughout the state with the end result being that each facility may use any one of the

procedures to purchase the same or a similar product. The department's purchasing and contracting policies and procedures need to be clarified and codified, especially those that govern purchases of chemical and petroleum products.

2. There are discussions currently about a statewide contract for used oil and parts washer solvent collection and reclamation. A statewide contract should reduce the cost to each facility. And each facility should be required to obtain such services via the statewide contract, if there is no other contract, or at the expiration of such contract if one exists. There is a dire need for uniformity in purchasing and contracting services, both for cost-savings and to limit independent decision-making by facility management which often creates the problems addressed in this report.

3. A memorandum should be issued by the appropriate department authority to all facility managers instructing them to locate, repair, and pump-out the contents of the oil separators. Feed drains and drains leading to city sewers should also be repaired. Drains leading from separators to storm sewers or ditches should be blanked (blocked) and the contents pumped, when the separator is full, for discharge at an amenable city sewer system. The "solids" residual from a separator, if it contains solvent, antifreeze, and other waste vehicle fluids, will have to be managed as a hazardous waste.

Recommendation of Policy and/or Procedure Regarding Vehicle Maintenance Waste Product Re-use and Reclamation (Other than oil)

1. Information about waste product compatibility will be provided by the assessment team to the appropriate department authority to include in a memorandum directing facility managers to segregate waste products and to designate an area in the shop and containers in the area for vehicle maintenance waste product storage. The memorandum should also require that statewide contracts awarded to pick up these waste products will be used by facilities on a regularly scheduled basis.

2. The current focus of the U.S. EPA on source reduction and pollution prevention through product substitution demands that INDOT thoroughly investigate the

availability of alternatives to solvent-based vehicle maintenance and repair products. One facility reported success with its experiment using a water soluble degreaser. The purchasing power of the department can be used to persuade product manufacturers to provide environmentally compatible products which can be discharged to city sewer systems. The outside agency member of the assessment team will research the current availability of such products and provide information to Ms. Newland.

3. Aerosol cans need to be emptied of their contents by forcing out as much of the product and propellant as possible. The cans, then, should be placed in a mechanical puncturing device designed to protect the user and punctured to release the remaining content. Only then should the container be disposed. An alternative to aerosol cans which should be investigated is the bulk (1. 2-1/2. or 5 gallon) mechanical spray ("squeeze the trigger") system available for some of these maintenance and repair products. The bulk container, obviously, is not as "handy" as an aerosol, however, its use does represent a cost-savings, eliminates the clutter of storage, and the disposal problems and hazards associated with aerosol cans, and they are refillable.

Personal preferences of shop foremen and mechanics and the proclivity for purchasing from certain local retail outlets which sell a certain type of product must be subjugated to the preference of the department to reduce costs and protect the environment and its employees. Some standardization in products allowed to be used for vehicle maintenance is necessary. The department should ask itself whether one vehicle maintenance shop really needs four different brands of carburetor cleaner.

Recommendation of Policy and/or Procedure Regarding Management and Use of Partial Containers of Various Products and Other Materials

1. It is recommended that a simple product exchange system be implemented by the department. A form should be designed on which each facility can list its "unwantables" or products available, by name and quantity. Another form would allow the listing of products wanted, by name and quantity. Both forms would be submitted to some division

office with a computer and operator to be assigned to enter this information in an exchange file, print copies of the listings, and distribute the master lists to the facilities. Facilities would be required to report successful transactions to the central office so the material could be deleted from both lists. Quarterly or semi-annual update reports of additional products available or wanted could be submitted; the master lists would be updated and returned to the facilities.

This system or some other needs to be instituted as a cost-savings measure and to reduce the potential for environmental degradation should the material continue to occupy facility space until the container or bag disintegrates. And disintegrating containers of unused (and some unknown) products were observed by the assessment team.

Recommendation of Policy and/or Procedure Regarding The Sharing of Authority and Responsibility for Hazardous Waste Management at Each INDOT Geographic Location

1. The department needs to establish a "chain-of-command" from the Commissioner's office to each of the INDOT facilities at all geographic locations. At geographic locations shared by one or more organizational entities (districts, sub-districts, units), the authority for waste management should be delegated to the district. And at the district-level of organization, it matters not whether the ultimate authority and responsibility of the district superintendent is vested in his Traffic, Operations, Maintenance, or Materials and Testing Division, but it has to be vested in one and only one. And it doesn't have to be the same division at each district. The district hazardous waste coordinator should be designated because of his/her interest in and knowledge of the subject. The person should also have some of his/her other responsibilities transferred to other personnel so the time is available to devote to this important function.

2. INDOT Central Office needs to clarify the provisions of the statewide hazardous waste pickup contract so that district authorities can coordinate waste management activities within their district. Because of its economic "power", the department should dictate to the contractor and require the contractor to serve all INDOT

facilities which generate waste products.³ Unless it is shown to be more costly, districts should conform to the provisions of the statewide contract and not be permitted to independently contract for the pickup, transportation, or disposal of any used or waste product (other than solid waste) or hazardous waste. This recommendation may appear contrary to the current efforts within the department to decentralize; however, the authority for assuring the competency, experience, and insurance of contractors must be centralized: the costs of environmental degradation and resulting liability are too great to allow the disparate management practices which will most certainly occur among the seven districts.

3. The contract(s) for used or waste product and hazardous waste pickup, transportation, and disposal services should specify only the "Indiana Department of Transportation", and the name of the District; there is no contractual need to specify one or another division in the contract; however, for accounting purposes, there may be a need to specify the division on purchase orders. Any disagreements about which division's account pays for these services can be remedied by allocating the cost per gallon (or pound) of waste generated by each division at the district level (unless some department or state policy precludes this) and "paying" into a central district account. This method not only allows better recordkeeping of the costs of hazardous waste generation by all divisions and distributes those costs proportionately, but it serves as an inducement to all divisions to reduce the volume of their waste streams (and, thus, their costs) through source reduction and recycling programs.

Recommendation of Policy and/or Procedure Regarding Containerization, Marking, and Storage of Hazardous Waste

³A statement was made by a department representative at a recent meeting that a Superior Oil representative said that INDOT would have to transport waste generated by units and sub-districts, located at other than the district location, to the district location because its contract requires only district pickup. This practice of INDOT transporting its own hazardous waste is discussed in Operational Impact 21. The practice cannot continue. The contract must specify pickup at every location. The Invitation to Bid for hazardous waste transportation and disposal for the period of July 1, 1991-June 30, 1992, should be revised in this regard.

1. Once the district hazardous waste coordinators are designated, the department should schedule them to attend a coordinator's training program which will be conducted by Purdue University's Environmental Management and Education Program, pursuant to the JHRP project. The coordinators should then schedule meetings with those personnel at facilities within their district who will assume responsibility for hazardous waste management.

2. A hazardous waste management policy and procedures manual should be developed and distributed to responsible personnel to guide them in their management activities. [Copies of EPA's Small Quantity Generator Guidebook, a companion guide to such a manual, have been provided to Ms. Newland to distribute to INDOT personnel.]

Recommendation of Policy and/or Procedure Regarding Transporting Hazardous Waste From One INDOT Facility to Another for Storage

1. A copy of the application form for an EPA identification number has been provided to Ms. Newland. The department should complete an application for each facility which does not now have a number and submit them, in batch, to U.S. EPA.

2. The appropriate department official should issue a memorandum directing facility managers to cease the practice of transporting hazardous waste to another facility. [Note: see Recommendation 2. Operational Impact 19 and footnote 3, page 20, regarding the need to clarify in the statewide hazardous waste contract that waste is to be picked-up at all INDOT-generator facilities.]

Recommendation of Policy and/or Procedure Regarding Distinctions Between Hazardous and Special Waste and the Management of Special Waste

1. The department should subject a sample of each waste stream to laboratory analysis (or retrieve these analyses if they exist) to determine the precise classification of the waste material as a hazardous or special waste.

2. The department should prepare and distribute a guide to the classification, coding, and identification of INDOT-generated hazardous and special wastes to insure

containers are correctly labeled and shipments of waste are properly manifested. Purdue will assist this effort.

Recommendation of Policy and/or Procedure Regarding Inventories and Storage of Herbicides

1. The department should conduct a cost/benefit analysis of its herbicide treatment program, weighing its potential liability from environmental degradation and occupational illness. Perhaps an interim step, if the data isn't already available, would be to survey department facilities requesting information on current inventories, including inventory held from last year, and the projected quantities to be used this year. Possibly reductions in quantity and variety of brands has already occurred and plans exist for reducing quantities and varieties further.

2. The appropriate department official should issue a policy concerning the storage of herbicides at facilities citing the Office of State Chemist rules and inspection guidelines. Purdue's Environmental Management and Education Program and the Office of State Chemist will assist the department in this activity.

Recommendation of Policy and/or Procedure Regarding Permitting Air Emissions from Vehicle Spray Painting Room

1. The department should secure the assistance of someone qualified to make the necessary assessments and/or perform the required emissions testing to determine if the Wabash and other department fixed vehicle spray facilities require air permits pursuant to IDEM regulations. Purdue's Environmental Management and Education Program will assist this effort.

Recommendation of Policy and/or Procedure Regarding Preparation of Facility Emergency Contingency Plans

1. A model INDOT facility emergency plan, which meets the OSHA and EPA requirements, will be drafted by Purdue as part of the JHRP project. The department should issue copies of the model to each facility and direct that the required facility-specific

information be entered and that other procedures, such as making arrangements with local emergency officials to provide assistance, be followed. A copy of each facility's plan should be returned to the appropriate department official to verify that the directive was followed.

Recommendation of Policy and/or Procedure Regarding Training and Certification of Wastewater Treatment Plant Operators

1. The Indiana Water Pollution Control Association has agreed to provide "package plant" operation training for INDOT employees for a total cost of \$4000. It is recommended that the department allocate this amount for the training. Purdue will assist the Association in preparing the course materials and curriculum.

2. It is recommended that a liaison relationship be extended to one or more treatment plant operation experts who can be contacted by INDOT operators for advice and assistance. Purdue can recommend individuals to serve in this role.

Recommendation of Policy and/or Procedure Regarding Possible Environmental Degradation by Abandoned INDOT Facilities

1. The Commissioner should direct that an inspection and environmental audit be conducted of all abandoned facilities. Thorough research should be conducted concerning the type of operations conducted at each facility (e.g., herbicide mixing, salt bed washout, tar kettle clean-out, paint mixing and transfer, etc.) and attempt to identify the location(s) at the facility where such operations were conducted. If contamination of the operations area is suspected, the department should arrange for soil and groundwater sampling and analysis. Voluntary remedial action should be taken if indicated.

2. If facility decommissioning procedures do not exist, the Commissioner or other appropriate authority should allocate the necessary personnel resources to develop such procedures. Federal facility procedures used when decommissioning a military base would provide a workable model for the department.

PART II

RECOMMENDATION OF POLICY AND/OR PROCEDURE REGARDING OCCUPATIONAL HEALTH AND SAFETY COMPLIANCE ISSUES

The recommendations for amelioration or remediation of a problem contained in this section of the report, like Part I, are organized by issue areas and are ordered according to the frequency of an observed problem and the severity of the problem as regards the lack of compliance with the regulations promulgated by the Indiana Occupational Safety and Health Administration. These regulations are identical to those promulgated by the federal OSHA agency.

Recommendation of Policy and/or Procedure Regarding Herbicide Storage, Mixing, Application and Rinsing

The application of herbicide, including restricted use herbicide, is often performed by unlicensed applicators. Unfortunately such application is permitted by regulation of the Office of State Chemist if the unlicensed applicator is able to have "direct voice communication" with a licensed supervising applicator by radio or telephone to summon the licensed applicator to provide information or assistance.

In Part I of this report, "Operational Impact 9: Herbicide Mixing and Tank Rinsing", it was recommended that, "the department...analyze the costs and benefits of continuing to utilize its employees, equipment, and facilities for herbicide spraying operations versus contracting all of this activity to other sources." Should the department continue to assign its employees to these tasks, a few policy and procedure changes will have to be implemented:

1. all employees who apply herbicides will have to participate in safety and health training. An EPA proposed rule, 40CFR Part 171 (November 7, 1990) if promulgated, will require such training. The training will have to be formal, of a specified

duration, and documented. A quick review of Material Safety Data Sheets by the District Landscape supervisor or the foreman will no longer suffice as "training"

2. personal protective equipment including chemical splash goggles, respirators, tyvek coveralls, boots, and gloves will have to be provided to each employee and the wearing of such equipment will have to be required and enforced

3. Material Safety Data Sheets or specimen labels which provide safety and health precautions will have to be provided to applicators and carried in the truck cab

4. every effort will have to be made to insure that restricted use herbicides are applied only by licensed applicators

5. emergency procedures will have to be adopted to insure that personnel contaminated by herbicides are properly decontaminated in the field and quickly transported to the nearest medical facility for treatment

Recommendation of Policy and/or Procedure Regarding Equipment Sandblasting and Painting

1. The department should immediately suspend all use of vehicle and equipment paint containing lead and/or lead chromate. There are acceptable substitutes which currently are in use at some INDOT facilities. However, if the department continues to use lead-based paint, the other recommendations in this section, then, must be followed.

OSHA's lead standard [29CFR1910.1025(j)] requires that employers institute a medical surveillance program for all employees who are or may be exposed above the action level for lead for more than 30 days per year. The Permissible Exposure Level (PEL) for lead chromate is $.05 \text{ mg/m}^3$ (.006 ppm) and the action level is $.03 \text{ mg/m}^3$ (.004 ppm). The exposure level is so infinitesimally small that overexposure of INDOT employees engaged in this operation is almost a certainty.

2. The assignment of sandblasting and painting equipment may have to remain a Code 700 activity for scheduling and work control purposes, however, these tasks should not be assigned to individuals who haven't received safety and health training. And in no case

should these tasks be performed without the employees being provided and required to wear the proper personal protective equipment. Personal protective equipment for lead chromate spray painting must include the use of HEPA filters in the respiratory protective equipment worn by employees, as well as in the paint booth exhaust system.

3. The department should initiate a survey of facilities to identify where equipment sandblasting and painting is performed. Then, inquiry should be made as to the type of personal protective equipment available to those performing these tasks. Identified equipment deficiencies should be remedied by purchases of the necessary equipment. It is recommended that the department issue a directive to all District Superintendents requiring the appropriate personal protective equipment to be worn by employees performing these tasks.

4. Some of the vehicle painting is contracted to Indiana Department of Correction facilities. INDOT, as a contractor, should advise these facilities of the precautions necessary to properly protect employees and inmates from exposure to lead and volatile organic compounds in the paint.

Recommendations for Policy and/or Procedures Regarding Traffic Paint Mixing and Transfer

The department should provide employees who load paint trucks with the appropriate personal protective equipment and require that it be worn whenever loading and reloading is done.

The department should immediately find alternatives to lead chromate-based yellow traffic paint. Certainly INDOT's purchasing power can demand suppliers to provide such paint which meets other department specifications.

Recent discussions within the department concerning the replacement of 55-gallon drums with 330-gallon totes or bulk tanks of traffic paint focus mainly on the environmental and drum recycling issues. Replacing drums with totes or bulk tanks will also reduce employee exposure regardless whether the contents are pumped or gravity-fed into the

paint truck because the valve to which the transfer hose is connected is the only opening to the tote or tank, thereby minimizing volatilization of the organic compounds within the container.

Recommendation of Policy and/or Procedure Regarding Vehicle and Equipment

Maintenance Tasks

Safety and health protection of INDOT employees begins with safeguarding the performance of the simple, routine tasks such as cleaning a greasy engine part, charging a battery, washing a truck or changing antifreeze. The perception that every man is inherently a skilled mechanic, having worked on his father's car at the age of six, creates ignorance about the hazards associated with such operations.

The Employee Safety Procedures Handbook includes some references to the hazards associated with these tasks:

- ventilation description (p. 4-1)
- wearing neoprene gloves to protect from acids (p. 5-3)
- cleaning with solvents (p. 10-1)
- procedures for handling batteries (p. 10-2)
- use of flammable liquids (p. 12-3)
- requirement for ventilation in laboratories (p. 23-2)

With the exception of the chapter on welding (pp. 16-1 to 16-3) the Handbook does not "connect" the performance of the vehicle maintenance tasks with their associated hazards. In the section "cleaning with solvents" (p. 10-1) in Chapter 10 titled "Maintenance Shops and Yards", there is only the advisory that "flammable solvents should not be used for cleaning. Only approved cans and washers should be used in these operations". For safety and health advice, the reader must find "Section 3: Use of Flammable Liquids and Gases" (page 12-3) in Chapter 12 "Flammable Gases and Liquids", and then extrapolate to the task he or she performs.

1. The Employee Handbook needs more specificity: typical tasks performed by INDOT employees need to be described and the hazards of those tasks clearly defined. It is recommended that the Commissioner through the Employee Safety Manager organize a job/hazard analysis work group to identify specific tasks performed by employees, the associated hazards, and the personal protective equipment required to be worn by employees performing such tasks. The word, "required", is underlined in the preceding sentence to emphasize another needed change in the Handbook: the word "should" is used throughout the text, as in: "employees should wear gloves". The word "should" is advisory and permissive and non-binding in most labor/management clauses. The word "should" should be replaced with the word "shall" in any policy or directive concerned with employee health and safety. The word "shall" is mandatory and binding.

2. Hazard Communication training has been provided at various times and locations to probably all employees with more than two years of service. It is strongly recommended that such training be delivered again. Purdue University's Environmental Management and Education Program will provide Train-the-Trainer training for selected INDOT employees in the near future. These individuals must be permitted to schedule employee training sessions as soon after their training as possible. It is sorely needed, especially by those performing vehicle and equipment maintenance and repair tasks.

Recommendation of Policy and/or Procedure Regarding Injecting Calcium Chloride in Salt Piles

No one to whom inquiry was made could explain why there are three different methods of injecting calcium chloride solution in salt piles. If one facility has it delivered pre-mixed and another contracts to have it injected by those delivering it, why must any INDOT employee be assigned to such a hazardous task?

1. It is recommended that the department require salt suppliers to provide pre-mixed calcium chloride or, where calcium chloride solution is required to be added after salt delivery, the department should contract only with suppliers who will also inject it. INDOT

employees should not be assigned this task or, certainly, should not perform this task without wearing the proper personal protective equipment.

Recommendation of Policy and/or Procedure Regarding Chlorine Use at Wastewater Treatment Facilities

1. The department should initiate a survey to identify its facilities, including roadside parks, where chlorine is present. It should insure that warning signs are posted in areas where chlorine is stored.
2. The job description for Sewage Disposal Plant Operation III does not adequately address the task of changing chlorine tanks, although the "working conditions" section of the job description refers to the incumbent's possible exposure to "gases and fumes such as methane, chlorine, and carbon monoxide" and that such exposure "requires the use of safety equipment such as gas masks or respirators".
3. No INDOT employee should be required to enter an area where chlorine gas is leaking to secure or repair a valve. Typically, a device known as a Chlorine "C" kit is used to shut off a leaking valve to a 150-pound chlorine cylinder. No one to whom inquiry was made was aware of the kit or the procedure and, yet, no one provided any information about how they are to respond or who they are to notify in the event of an emergency.

The Chlorine Institute maintains a network of "Chlor-reps" throughout the country. There are at least three of these experts in Indiana. An emergency procedure for chlorine releases will be drafted by Purdue to include notification of the "Chlor-rep" nearest each facility. Other than notification, INDOT employees should be instructed to evacuate the premises, direct the evacuation of others, and refrain from any effort to shut-off or repair a leaking cylinder.

Recommendation of Policy and/or Procedure Regarding Emergency Response by INDOT Employees

1. The appropriate department official should update and expand Operating Procedure 20. Laws enacted and regulations promulgated by federal and state agencies

since December 1984 (the date of the Procedure) more severely restrict the activities of INDOT personnel at the scene of hazardous materials spill. Purdue will assist in the preparation of the revision. The Illinois Department of Transportation policy states that "No IDOT employee shall participate in the clean-up and handling of hazardous materials and waste owned by a private party".

2. A policy should be issued to all facility managers prohibiting the involvement of department personnel and/or equipment in the removal of sand contaminated by any hazardous substance, regardless how "slight" or how "harmless" the substance may be.

3. A policy should be issued to all facility managers prohibiting the involvement of department personnel and/or equipment in the removal of containers of any type or dry material of any type, regardless of the identity of the substance on a container label or by an individual at the scene until the identity is confirmed by laboratory analysis or inspection by an individual with the appropriate scientific credentials and the material is determined to be non-hazardous.

4. Operating Procedure 13; Maintenance Field Operations Manual, revised May 1, 1991 (by John Burkhardt, thru Donald Scott, to District Directors) regarding "Removal and Disposal of Material and Objects from the Right-of-Way", should be amended to include a warning that under no circumstances shall INDOT employees remove and dispose of unknown or hazardous materials abandoned on highway right-of-ways or left in the right-of-way as a result of a wreck or accident. The revised procedure, in section 4, does not exclude such material. Reference to a revised Operating Procedure 20 could also be made in Operating Procedure 13.

Recommendation of Policy and/or Procedure Regarding Performance of Work Tasks

Involving the Handling of Hazardous Waste

1. Purdue University will develop and deliver an initial training program for 12 department employees who will serve as hazardous waste coordinators. These employees will be trained to provide training to others within each district who have responsibility for

hazardous waste handling. The department needs to ensure that follow-up training is provided to these employees.

2. The RCRA regulations require training on various aspects of the facility's emergency contingency plan. A model emergency contingency plan will be developed by Purdue and used in the training program. The department will need to provide for the update of that plan once it is accepted.

3. OSHA training requirements for hazardous waste handlers are similar to those for persons responding to hazardous materials spills and releases. Purdue will conduct three 24-hour training programs for a total of 50 INDOT employees. Topics including hazard recognition, hazard control, and personal protective equipment will have relevance for employees involved in either emergency response or hazardous waste handling. The department needs to provide for annual refresher training for these employees.

4. Guidelines for employees who perform tasks involving hazardous materials and waste will be developed by Purdue and recommended to the department for adoption as a policy manual. The manual will address the issues discussed here and will provide step-by-step descriptions of the procedures employees should follow.

Recommendation of Policy and/or Procedure Regarding Central Materials and Test

Laboratory

1. Labels on chemical containers should be replaced with ones containing information required by the OSHA Hazard Communication Standard.

2. A Chemical Hygiene Plan should be developed and appropriate employee training conducted.

3. A Respiratory Protection Program required by 29CFR1910.134, including fit-testing and training, should be implemented and all protective equipment should be stored and maintained in a proper manner.

4. A record should be maintained indicating proper maintenance of SCBA's and that the units are in good working condition. The Respiratory Protection Program needs to be implemented and employees trained to use the SCBA.

5. Substitute grounded floor fans in place of the current units.

6. Prohibit consumption of food and beverage in the labs to reduce the potential for ingesting contaminated food and drink.

7. Flammable and combustible materials should be stored in the Flammable Storage room on the south side of the building. These areas must conform to OSHA regulations at 29CFR1910.106.

8. Air monitoring for Mercury should be performed to determine concentrations in the shrink unit testing area. Also the refrigerator should be removed from the lab if it is to be used for storage of food.

9. Air monitoring for respiratory dust exposures in the soil preparation area during pulverizing should be performed. Better housekeeping is needed in this area.

10. Air monitoring for silica levels in the cement preparation room should be performed. Flammables should be stored in approved areas. Epoxy spray application should be performed in approved areas. The humidity cabinet handle should be repaired to prevent employees from becoming trapped inside.

11. The other asbestos has been removed from the facility. The old ceiling tiles stored in the janitor's closet should be tested to determine if it contains asbestos and, if so, disposed of properly.

12. The original labels on drums being used for the disposal of waste should be removed and proper hazardous waste labels affixed.

13. Freon cylinders stored in the Boiler Room should be stored in another area and chained to the wall to prevent them from being knocked over.

14. The portable can of gasoline stored in the stock room should be placed in the Flammable Storage Room.

15. Drums of lapping oil in Room B should be labeled as "Used Lapping Oil -- To Be Reclaimed".

16. Any type of hazardous waste in any quantity must be manifested at the point of generation (each lab) and not transported to a central collection point. The small container of mercury at the Central Lab should be manifested and properly transported for disposal as hazardous waste pursuant to EPA regulations.

17. Hazardous waste should be separated from virgin chemical product and correct labels with the required information should be affixed to each drum of waste.

18. The aggregate treated with Bioact and trichloroethylene which is dumped in the "pit" should be sampled to determine if its a solid, non-hazardous waste, a special waste, or a hazardous waste and, then, managed according to the pertinent EPA and IDEM regulations.

Recommendation of Policy and/or Procedure Regarding Print Shop and Cartography and Photogrammetry Departments

Print Shop

1. MSDSs for Print Shop chemicals must be available to employees while they are working in the Print Shop. A complete inventory of chemicals and MSDSs should be completed and the results matched to insure that an MSDS is available for each chemical product.

2. All containers of chemical product including portable and stationary process containers, must be labeled pursuant to the provisions of OSHA's Hazard Communication Standard.

3. Unused or partially used, outdated chemical products should be disposed of as hazardous waste, unless another use or user can be located.

4. The importer of products manufactured in foreign countries has the responsibility for insuring such products are properly labeled, pursuant to U.S. laws and regulations. INDOT should not purchase or distribute chemical products improperly labeled as it constitutes a violation of the OSHA Hazard Communication Standard and the U.S. DOT regulations.

Cartography Department

5. A MSDS can be used in lieu of a label on a stationary process container; however, the vendor (which is not LSC) has not supplied one. The vendor must supply a MSDS.

Photogrammetry Department

6. In lieu of labels, MSDSs may be posted near the 25-gallon developer and fixer tanks to alert employees of the hazards of the developer and fixer.

7. The fluid from the Photoprocessor 4100Z is a hazardous waste stream and should be treated no differently than waste generated by a maintenance facility: it must be properly containerized, labeled, stored, manifested, transported, and treated or disposed.

Recommendation of Policy and/or Procedure Regarding INDOT Confined Space Entry Program

The Employee Safety Manager issued a "draft" Confined Space Entry Program by memorandum to Division Chiefs, Safety Coordinators, and District Department Heads, dated September 10, 1990. The reason for the distribution of the draft program according to the cover memorandum is that "we have been cited under the general duty clause [by IOSHA] for failure to have a written Confined Space Entry Program". The draft Program is to "become part of the Employee Safety Policy and Procedures manual", according to the memorandum.

The draft Program is a good general statement of the topics to be addressed in a Confined Space Entry Program; however, it lacks the detail necessary to insure that INDOT employees are adequately protected from the hazards of confined spaces.

An employer's development and implementation of a written Confined Space Entry Program, pursuant to the OSHA proposed rule, "Permit Required Confined Spaces" (29CFR1910.146) requires, also, the development and implementation of a written program pursuant to OSHA's final rule, "Control of Hazardous Energy Sources (Lockout/Tagout)" (29CFR1910.147) promulgated September 20, 1990 (FR38677 et seq.) and the development and implementation of a written Respiratory Protection Program, pursuant to OSHA's regulation found at 29CFR1910.134. Neither a written Lockout/Tagout Program or Respiratory Protection Program was located by the assessment team.

The implementation of the draft Confined Space Entry Program requires more than statements about the need for training in "confined space recognition, atmospheric testing and hazard assessment, ventilation practices, personal protective equipment, entry procedures, rescue procedures, and first aid and CPR", the actual procedures for each of the above must be described in detail and each training subject should be supported by a training curriculum appended to the written draft or referenced to a file copy maintained by those to whom the draft was distributed. INDOT administration should not assume that safety directors are sufficiently competent or qualified in all the training subjects to insure compliance with the various regulations and protect employee lives. How will "the Department of Transportation...insure that employees who may be required to enter a confined space receive training covering..." the subjects listed on page 4 of the draft? A training plan must be developed.

1. The department should first survey all facilities, rest parks, weigh stations, lift stations and other state properties it services to identify the location of known confined spaces. Then it should survey the districts and the Tollway to identify current employees, by name and job title, who have ever been assigned to perform tasks in these confined spaces. Then each confined space should be inspected and evaluated to determine if there are hazardous energy sources that need to be locked-out and/or tagged-out and if any of the

confined spaces would require the use of air purifying (e.g., cartridge) or air supplied (e.g., SCBA) respiratory protection.

2. Employees must be selected and trained as the Person Authorizing Entry, the Qualified Person, entrants, attendants and rescuers -- these functions must be assigned, they cannot be performed by volunteers or those designated at the time the work activity commences. Training must include such topics as donning/doffing personal protective equipment, entry procedures, entrant-attendant communication, attendant responsibilities, rescue procedures, testing procedures for oxygen level, flammable hazards, and toxic materials, among other tasks. Confined space entry and rescue is not a job that anyone can do -- it is a highly specialized function.

Purdue University will meet with the Safety Manager and share information about written Confined Space Entry, Lockout/Tagout, and Respiratory Protection Programs which can be adapted for INDOT use. If the extension/expansion of the JHRP contract is approved, Purdue will assist the identification and evaluation of confined spaces. At some future date, if support is available, Purdue will conduct Confined Space Entry Training for those responsible for training others within the department.

ATTACHMENT 2

Report of Industrial Hygiene Assessments at INDOT Field and Support Facilities

**REPORT OF INDUSTRIAL HYGIENE ASSESSMENTS
AT INDOT FIELD AND SUPPORT FACILITIES**

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REPORT OF INDUSTRIAL HYGIENE ASSESSMENTS AT INDOT FIELD AND SUPPORT FACILITIES

A variety of locations throughout the state were visited by Calvin Lee, INDOT Safety Director, and Ms. Cheryl Lindsey, Industrial Hygienist with the Environmental Management and Education Program to observe specific operational tasks. This report includes recommendations for the amelioration or remediation of safety and health problems. The results of personal monitoring performed at the INDOT facilities are reported here along with recommendations deemed necessary by the monitoring results.

The reporting of assessment recommendations in this report are organized by issue areas for each facility and are ordered according to the references located in the 29 CFR 1910 OSHA General Industry Standards.

Recommendations can only be made about the conditions observed during the time of the on-site visit. Conditions may vary depending upon meteorological factors, number of employees, procedures used in performing work tasks, amount of employee supervision, and other factors. If conditions vary greatly from one facility to another additional sampling may be warranted, as required by the General Industry Standards. Also, other facilities performing the same tasks may or may not experience the same problems. It is suggested that each facility be reviewed, using the following information, and that necessary corrective action be made based on those findings.

TASKS REVIEWED

1. Herbicide Storage, Mixing, Application, and Rinsing
2. Equipment Sandblasting
3. Equipment Painting
4. Traffic Painting
5. Traffic Paint Mixing and Transfer
6. Vehicle and Equipment Maintenance
7. Chlorine Use at Wastewater Treatment Facilities
8. Lift Stations Access for Maintenance
9. Laboratory Processes

Operations involving calcium chloride injection in the salt piles and bridge work projects were not reviewed in this study. According to Calvin Lee there are currently no facilities performing the injection process. The schedule did not allow for a visit to a bridge project.

SUMMARY OF FINDINGS

- Potential overexposure to noise during Vehicle and Equipment Maintenance
- Overexposure to Lead during Equipment Painting Operations
- Potential overexposure to noise during Equipment Painting Operations
- Overexposure to total dust during Sandblasting Operations
- Overexposure to paint solvents during Equipment Painting Operations
- Potential overexposure to noise during Sandblasting Operations
- Potential overexposure to hydrocarbons during the asphalt extraction process performed in test laboratories

EQUIPMENT SANDBLASTING

RECOMMENDATION: It is recommended that any sandblasting operations be performed inside an approved sandblasting area. The area must be constructed in accordance with 29 CFR 1910.94 (a)(3). The design of the blasting enclosure must include:

1. Exhaust ventilation designed so a continuous flow of inward air movement is maintained at all times.
2. All air inlets or access openings shall be baffled.
3. Safety glass protected by screening must be used for observation windows.
4. Doors must be flanged and tight when closed and must be operable from the inside and the outside.

RECOMMENDATION: A written respiratory protection program should be prepared and all employees using respirators should be trained as soon as possible. The requirements for an acceptable program are located in 29 CFR 1910.134 (b).

RECOMMENDATION: Employees must be trained and fit tested to ensure adequate protection is being provided by the respirator. The requirements are located in 29 CFR 1910.134 (e)(5)(i).

RECOMMENDATION: A worker performing the sandblasting operation was wearing an airline respirator and a hood with a carbon filter. The pump, manufactured by Bullard Free-air pumps, was placed near the exhaust of the Sullair 30903 air compressor. Carbon monoxide can be generated by the compressor. The

unit was not equipped with a carbon monoxide alarm or a high pressure alarm. The person did not wear a safety line to perform the operation.

The airline supply should be located away from sources of contamination. The unit should be equipped with the proper alarms. If a Carbon monoxide alarm is not installed, then the air must be tested frequently to ensure that it meets the proper air quality. These requirements are located in 29 CFR 1910.134(d)(2)(ii).

RECOMMENDATION: A Sound Level Meter reading of 92 (db) was obtained at the facility during sand blasting operations.

The employees who are exposed to these noise levels should be included in the Hearing Conservation Program, 29 CFR 1910.95 (c). The regulation addresses monitoring, training, audiometric testing and the use of hearing protection. Any area over the 90 dB level should also be evaluated in terms of engineering or administrative controls for the reduction of the noise. Employees must be offered a variety of hearing protectors but only employees working in the 90 dB area or those who have a documented standard threshold shift in their hearing are required to wear the protective devices. Complete noise dosimetry may be needed at the facility.

RECOMMENDATION: A worker performing the sandblasting operation was monitored for exposure to total dust. The samples were collected on pre-weighed PVC filters and were analyzed by the laboratory that supplied the sample media. The sample was collected on the outside of the respirator to determine the total amount of exposure and the level of protection needed by the employee performing the task. The exposure results indicated an exposure level of 1100 mg/m^3 during a 16 minute sampling period. The worst case of exposure would be if the worker performed the task for an 8 hour day. However, even considering shorter work periods, the employee TWA would be 36.7 mg/m^3 . When compared to the listed

Permissible Exposure Limit (PEL) of 15 mg/m^3 it is determined that the worker was exposed to amounts above the legal limit.

The exposure to this worker was above the PEL for total dust. OSHA has determined that the exposures must be controlled by engineering and/or administrative means first, if an overexposure occurs. The use of respiratory protection may be used to protect the worker during the implementation of controls or to supplement the controls for the complete protection of the employee. The listed OSHA PEL's are located in 29 CFR 1910.1000.

EQUIPMENT PAINTING

RECOMMENDATION: All of the electrical outlets and sources in a paint storage room must be intrinsically safe to reduce the risk of ignition of the flammable material. Light switches should be located on the outside of the room. The room should be constructed of a non-combustible material. The room should have a supply of fresh air provided by either gravity or mechanical ventilation. Requirements of a proper paint storage room as specified in 29 CFR 1910.106 (d)(4) include:

1. A raised sill at least 4 inches in height, or the floor in the room shall be 4 inches below the surrounding floor. Another option is an open-grated trench inside the room which drains to a safe location.
2. All openings shall have self-closing doors.
3. The room must be liquid tight where the walls join the floor.
4. Electrical wiring must be approved for hazardous locations.
5. The room must have gravity or mechanical exhaust.
6. There must be one clear aisle at least three feet wide.
7. Containers over thirty gallons must not be stacked one upon the other.

8. Dispensing of materials shall be with an approved pump or self-closing faucet only.

RECOMMENDATION: It is suggested that all painting operations be performed inside a spray booth or spray area which meets the requirements of 29 CFR 1910.107. The use of proper facilities will reduce the risk of employee exposures, fires and the uncontrolled release of chemicals into the environment.

RECOMMENDATION: OSHA regulation 1910.107 (c)(6) requires electrical wiring and equipment not subject to deposits of combustible residues, but located in the spraying area, to be explosion-proof. Any other equipment or process which may produce sparks must be located at least twenty feet away from the spraying. The spraying operations should not be performed in this area. Any spraying operations should be performed in an area or booth that meets the safety requirements for electrical, ventilation and other standards listed in the same subsection referenced above. Containers of paint should be kept closed when not in use. This helps reduce the amount of volatile materials in the area.

RECOMMENDATION: 29 CFR 1910.107 (c)(3) states, "Space-heating appliances, steampipes, or hot surfaces shall not be located in a spraying area where deposits of combustible residues may readily accumulate." The paint surface should not be heated or dried with appliances which could have hot surfaces.

RECOMMENDATION: All waste materials, rags and other paint impregnated materials should be placed in closed containers and properly disposed of at the end of each work day. This is referenced in 29 CFR 1910.107 (g)(3).

RECOMMENDATION: A written respiratory protection program should be prepared and all employees using respirators should be trained as soon as possible. The requirements for an acceptable program are located in 29 CFR 1910.134 (b).

RECOMMENDATION: The employee must be trained and fit tested to ensure adequate protection is being provided by the respirator. The requirements are located in 29 CFR 1910.134 (e)(5)(i).

RECOMMENDATION: Respirators should be stored in a clean, dry location and should be sealed in a bag to prevent contamination from other sources. The respirators should be kept in good working order. The straps, facepieces, and valves should be replaced as needed. The requirements are located in 29 CFR 1910.134 (f).

RECOMMENDATION: 29 CFR 1910.134 states, "Respirators shall not be worn when conditions prevent a good face seal. Such conditions may be a growth of beard, sideburns, a skull cap that projects under the facepiece, or temple pieces on glasses." These conditions, as well as the absence of dentures, can seriously affect the proper fit of the respirator.

RECOMMENDATION: An employee applied the brown primer coat paint to the inside and the outside bed of a truck. The spraying was performed in a curtained off section of the East building. The employee was monitored for exposure to xylene. The samples were collected on charcoal tubes and were analyzed by the laboratory that supplied the sample media. The sample was collected on the shoulder of the employee. The worst case of exposure would be if the worker performed the task for an 8 hour day. For the purpose of this study the exposures are assumed to be the Time-Weighted Average (TWA) exposure, unless otherwise indicated.

The exposure results of 39 ppm were compared to the listed Permissible Exposure Limits (PELs) of 100 ppm TWA and 150 ppm Short Term Exposure Limit (STEL). The exposures to these workers were below the PELs for xylene. The listed OSHA PEL's are located in 29 CFR 1910.1000.

RECOMMENDATION: Flammable and combustible material stored outside of a cabinet or storage room shall not exceed 25 gallons if they are Class 1A liquids in containers. A Class 1A liquids, by definition, have a flashpoint less than 73°F and have a boiling point less than 100°F. It is suggested that the paint be stored in flammable cabinets. If there is not enough room in the cabinets then additional storage space should be provided. This is referenced in 29 CFR 1910.106 (e)(2)(ii)(b).

RECOMMENDATION: 29 CFR 1910.106 (b)(9) states, "Spray booths shall be so installed that all portions are readily accessible for cleaning. A clear space of not less than 3 feet on all sides shall be kept free from storage or combustible construction." These materials should be relocated.

RECOMMENDATION: OSHA regulation 1910.107 (c)(5), states, "Unless specifically approved for locations containing both deposits or readily ignitable residue and explosive vapors, there shall be no electrical equipment in any spraying area, whereon deposits of combustible residues may readily accumulate, except wiring in rigid conduit or in boxes or fittings containing no taps, splices, or terminal connections." The fan and the stereo speakers and any other electrical device which could create a spark during spraying operations should be prohibited in the booth unless they meet the safety requirements for electrical equipment.

RECOMMENDATION: 29 CFR 1910.107 (g)(2) states, "Scrapers, spuds, or other such tools used for cleaning purposes shall be of nonsparking material." These tools should be replaced with nonsparking tools made of bronze or other similar materials which does not spark.

RECOMMENDATION: A Sound Level Meter reading of 91 (db) threshold was obtained by EMEP inside the spray booth during spraying operations.

The employees who are exposed to these noise levels should be included in the Hearing Conservation Program, 29 CFR 1910.95 (c). The regulation addresses monitoring, training, audiometric testing and the use of hearing protection. Any area over the 90 dB level should also be evaluated in terms of engineering or administrative controls for the reduction of the noise. Employees must be offered a variety of hearing protectors but only employees working in the 90 dB area or those who have a documented standard threshold shift in their hearing are required to wear the protective devices. Complete noise dosimetry may be needed at the facility.

RECOMMENDATION: Air monitoring conducted at the facility indicates that employee exposures are near one-half of the PELs for xylene and chromates. The spray painter was monitored for exposure to xylene and chromates. The samples were collected on charcoal tubes and special chromate filters and were analyzed by the laboratory that supplied the sample media. The sample media was located on the shoulder of the worker. The exposure results indicated an exposure level for xylene 72 ppm during a 64 minute sampling period. Exposure results for chromates in the paint were 0.06 mg/m^3 and 0.055 mg/m^3 for sampling times of 32 and 26 minutes respectively. The worst case of exposure would be if the worker performed the task for an 8 hour day. For the purpose of this study the above exposure is assumed to be the Time-Weighted Average (TWA) exposure. When compared to

the listed Permissible Exposure Limits (PELs), 100 ppm TWA and 150 ppm STEL for xylene and 0.1 mg/m³ for chromates. it is determined that the worker was not exposed to amounts the above the legal limit.

The exposures to this worker were below the PELs, however, the exposures are near one-half of the PELs xylene and chromates. It is suggested that these exposures be considered as overexposures due to the low PEL values. OSHA has determined that the exposures must be controlled by engineering and/or administrative means first, if an overexposure occurs. The use of respiratory protection may be used to protect the worker during the implementation of controls or to supplement the controls for the complete protection of the employee. The listed OSHA PEL's are located in 29 CFR 1910.1000. One method of reducing the exposure would be better and regular maintenance of the spray booth to insure effective amounts of air flow to reduce the exposures.

RECOMMENDATION: Air monitoring of a spray paint operation for lead indicates that employee exposures are in excess of the Permissible Exposure Limit (PEL) of 50 ug/m³. The samples were collected on mixed cellulose ester fiber filters and were analyzed by the laboratory that supplied the sample media. The sample media was located on the shoulder of the worker. The exposure results indicated an exposure level of 6,000 ug/m³ during a 58 minute sampling period. The worst case of exposure would be if the worker performed the task for an 8 hour day. However, even considering shorter work periods, the employee TWA would be 725 ug/m³.

Engineering, work practice and administrative controls should be reviewed in order to reduce these overexposures. OSHA has determined that the exposures must be controlled by engineering and/or administrative means first, if an overexposure occurs. The use of respiratory protection may be used to protect the worker during the implementation of controls or to supplement the controls for the

complete protection of the employee. When compared to the listed Permissible Exposure Limit (PEL) of 50 ug/m^3 it is apparent that the worker was exposed to usually high amounts above the legal limit. Engineering controls for paint spray booths do not have to be implemented until the exposure is at an amount in excess of 200 ug/m^3 . This exposure amount is related to a judicial stay which covers spray paint booths. INDOT must meet the 50 ug/m^3 level for engineering and work practice controls in 1996. Until then any combination of administrative, work practice and personal protective equipment to reduce the exposure levels is acceptable. The 200 ug/m^3 amount has been exceeded, therefore, engineering controls must be implemented. All other requirements of the Lead Standard must comply with either the Action Level of 30 ug/m^3 or the PEL of 50 ug/m^3 .

It is suggested that the most effective way of reducing the exposure to Lead in the equipment painting operation is by the substitution of a "lead-free" alternative.

RECOMMENDATION: Respirators with a higher protection factor should be used during the spray painting operations using Lead-containing paints. A powered, air-purifying respirator with high efficiency filters which provides a protection factor of 1000 times the PEL or $50,000 \text{ ug/m}^3$ would be acceptable for worker protection.

RECOMMENDATION: 29 CFR 1910.107 (d)(2) requires that all spraying areas must be provided with mechanical ventilation adequate to remove flammable vapors, mists, or powders to a safe location and to confine and control combustible residues so that life is not endangered. A system for make-up air should be installed as soon as possible to insure that the spray booth ventilation system functions adequately.

RECOMMENDATION: 29 CFR 1910.107(b) requires that intrinsically safe electrical equipment be installed in locations where flammable materials are used.

RECOMMENDATION: The quantity of flammable materials stored in the spray booth should not be greater than a one day supply. Bulk storage of flammable materials should be in a separate flammable storage area. This is required in 20 CFR 1910.107 (e)(2).

RECOMMENDATION: Air monitoring conducted at the facility indicates that employee exposures are in excess of the Permissible Exposure Limit (PEL) of 100 ppm TWA and 150 ppm STEL for exposure to toluene in the spraying operations. The samples were collected on charcoal tubes and were analyzed by NATLSCO, the laboratory that supplied the sample media. NATLSCO is certified by the American Industrial Hygiene Association. The sample media was located on the shoulder of the worker. The exposure results indicate an exposure level of 160 ppm during a 21 minute sampling period. The worst case of exposure would be if the worker performed the task for an 8 hour day. Regardless of the time of the exposure, the employee was also over the PEL for the Short Term Exposure Limit.

Engineering, work practice and administrative controls should be reviewed in order to reduce these overexposures. OSHA has determined that the exposures must be controlled by engineering and/or administrative means first, if an overexposure occurs. The use of respiratory protection may be used to protect the worker during the implementation of controls or to supplement the controls for the complete protection of the employee.

VEHICLE AND EQUIPMENT MAINTENANCE AREAS

RECOMMENDATION: The General Industry Standard states in section 1910.37 (k)(2), "Means of egress shall be continuously maintained free of all obstructions or impediments to full instant use in the case of fire or other emergency." Doors should be repaired to allow egress from the building.

RECOMMENDATION: The General Industry Standard states in section 1910.176 (b), "Storage of materials shall not create a hazard. Bags, containers, bundles, etc., stored in tiers shall be stacked, blocked, interlocked and limited in height so that they are stable and secure against sliding or collapse." Materials stored on top shelves should be only one box high. Any materials stacked higher should be restrained to prevent materials falling into the aisles.

RECOMMENDATION: 29 CFR 1910.23 (a)(9) states, "Every floor hole into which persons cannot accidentally walk...shall be protected by a cover that leaves no openings more than 1 inch wide." Holes should be covered to eliminate tripping hazards.

RECOMMENDATION: Any cords, chains or other items lying on floors may produce potential tripping hazards. The requirements are addressed in 29 CFR 1910.22 (a), the housekeeping paragraph of walking-working surfaces.

RECOMMENDATION: The storage of flammable materials on the ground or upper floors of an unprotected storage area cannot exceed 660 gallons maximum capacity. Flammable products stored in some areas may be in excess of this amount. This requirement is located in 29 CFR 1910.106 (d)(5)(2).

RECOMMENDATION: 29 CFR 1910.305 (e)(1) addresses design safety standards for electrical systems. It states, "Cabinets, cutout boxes, fittings, boxes, and panelboard enclosures in damp or wet locations shall be installed so as to prevent moisture or water from entering and accumulating with the enclosures. In wet locations the enclosures shall be weatherproof." This also applies to switches, circuit breakers, and switchboards. Electrical fixtures should be protected from wet conditions or sources of water should be relocated.

RECOMMENDATION: 29 CFR 1910.305 (b)(1) states that, "openings in cabinets, boxes, and fittings shall be effectively closed." The covers on all of the electrical boxes, junctions, and cabinets must be kept closed.

RECOMMENDATION: A Sound Level Meter reading was obtained in the vehicle maintenance area. The noise reading was 99 decibel (dB) while an employee was using an impact wrench.

The employees who are exposed to these noise levels should be included in a Hearing Conservation Program, 29 CFR 1910.95 (c). The regulation addresses monitoring, training, audiometric testing and the use of hearing protection. Any area over a 90 dB level should also be evaluated in terms of engineering or administrative controls for the reduction of the noise. Employees must be offered a variety of hearing protectors but only employees working in the 90 dB area or those who have a documented standard threshold shift in their hearing are required to wear the protective devices. Complete noise dosimetry may be needed at the facility.

RECOMMENDATION: The OSHA Hazard Communication Standard [29 CFR 1910.1200 (f)(5)] states, "...the employer shall ensure that each container of

hazardous chemicals in the workplace is labeled, tagged or marked with the following information:

- (i) Identity of the hazardous chemical(s) contained therein; and
- (ii) Appropriate hazard warnings."

The appropriate label should be affixed to all containers of hazardous chemicals.

RECOMMENDATION: It is suggested that all materials stored on shelving should be placed entirely on the surface of the shelf. It is also suggested that all chemicals stored on open shelving above floor height be restrained to prevent possible spillage. The propane containers should be repositioned closer to the floor.

RECOMMENDATION: When flammable materials are stored in the direct sunlight it is possible that pressure may build inside the container and may ignite from the heat. It is suggested that any container of flammable materials be stored in a location where the container will be protected from the sun.

RECOMMENDATION: All electrical sources must be intrinsically safe where flammable materials are stored. Flammables should be moved to a safe area where any vapors being released will not have the potential to ignite. This situation is not specifically addressed in the OSHA regulations.

RECOMMENDATION: Shelving should be utilized to keep floors uncluttered and free of tripping hazards. This is required by 29 CFR 1910.22(a)(1).

RECOMMENDATION: Roofs should be repaired to prevent water from entering the building. At a minimum, standing water creates a slipping hazard which is prohibited under 29 CFR 1910.22(a)(2). However, a more serious concern is the proximity of the electric outlets and light fixtures to standing or dripping water.

RECOMMENDATION: Leaking containers should be removed from buildings and contents should be transferred to undamaged containers approved for the storage of flammable liquids. These actions are required under 29 CFR 1910.106(d)(5)(iv)(e).

RECOMMENDATION: Storage of flammable or combustible liquids may create problems associated with emergency egress routes. This is addressed in 29 CFR 1910.106(d)(5)(i) which states, "Flammable or combustible liquids, including stock for sale, shall not be stored so as to limit use of exits, stairways, or areas normally used for the safe egress of people."

RECOMMENDATION: Intrinsically safe outlets and toggle switches should be installed on parts cleaners, as required by 29 CFR 1910.307(b), if the units contain flammable materials.

RECOMMENDATION: An emergency shower or another means of flushing the body, should be installed near the eye wash station. The shower should provide at least fifteen (15) continuous minutes of running water as recommended by ANSI standard Z358.1 (1992). The requirement for suitable facilities for quick drenching or flushing where the eyes and body may be exposed to corrosive materials, such as battery acid is located in 29 CFR 1910.151 (c).

RECOMMENDATION: Chocking the wheels before working on, or within the path of, a vehicle is an important safety practice and should be followed at all times. Wheel chocks of sufficient size and number should be placed in areas where they can be conveniently accessed in the shop. Signs and periodic reminders will help employees remember to use good safety practice at all times.

HERBICIDE MIXING

RECOMMENDATION: The proper protective equipment for the mixing of the herbicide should include chemical goggles, rubber gloves, and a chemical resistant apron. The wearing of cotton clothing or tennis sneakers allows spilled material to be absorbed into the material and hold the herbicide next to the person's skin. This could create adverse health effects such as skin irritation and eventually the herbicide could be absorbed through the skin.

RECOMMENDATION: Facilities should be provided for an emergency shower and eyewash which is easily accessible to the employees. This is required in 29 CFR 1910.151 (c).

TRAFFIC PAINT MIXING AND TRANSFER

RECOMMENDATION: The proper protective equipment for the mixing of the paint should include chemical goggles, and rubber gloves at a minimum. The wearing of cotton gloves or tennis sneakers allows spilled material to be absorbed into the material and holds the paint solvents next to the person's skin. This could create adverse health effects such as skin irritation.

RECOMMENDATION: Employees mix and load yellow and white traffic paint onto the trucks. Samples were obtained for toluene, xylene, and lead. The samples were collected on charcoal tubes or mixed cellulose ester fiber filters and were analyzed by the laboratory that supplied the sample media. The sample was collected on the shoulder of the employee on the unit. The worst case of exposure would be if the worker performed the task for an 8 hour day. For the purpose of this study the exposures are assumed to be the Time-Weighted Average (TWA) exposure, unless otherwise indicated.

The exposure results were compared to the listed Permissible Exposure Limits (PELs). The exposures to these workers were below the PELs for toluene, xylene, and lead. The listed OSHA PEL's are located in 29 CFR 1910.1000.

RECOMMENDATION: 29 CFR 1910.106 (e)(6) states, "Adequate precautions shall be taken to prevent the ignition of flammable vapors. Sources of ignition include but are not limited to open flames; lightning; smoking; cutting and welding; hot surfaces; frictional heat; static, electrical, and mechanical sparks; spontaneous ignition, including heat-producing chemical reactions; and radiant heat." It is recommended that the transfer of paint from drums to paint trucks be carried out away from any source of ignition. According to the department a new pump has been ordered that will be static proof. It is suggested that the specifications for the pump be reviewed to insure that it will not create a spark. Until the arrival of the new pump, the gasoline-powered pump should not be used for this operation.

CHLORINE USE AT WASTEWATER TREATMENT FACILITIES

RECOMMENDATION: Aeration tanks should be guarded according to the requirements listed in 29 CFR 1910.23(a)(9). The proper cover will prevent accidental falls into the tank.

RECOMMENDATION: Work at wastewater treatment facilities involves the use of corrosive and irritating materials such as chlorine. No emergency eyewash or shower is readily available to the employees.

Facilities should be provided for an emergency shower and eyewash which is in easy access to the employees. This is required in 29 CFR 1910.151 (c).

RECOMMENDATION: Employees performing tasks in the wastewater treatment area may be exposed to potentially infectious materials. The provisions of the Bloodborne Pathogens Standard [29 CFR 1910.1030] should be instituted.

The standard includes an exposure control plan, engineering and work practice controls, personal protective equipment, housekeeping, vaccinations, signs and labels, information and training, and recordkeeping. The requirements of this standard should be implemented.

RECOMMENDATION: Wastewater treatment facilities have areas which are confined spaces, according to OSHA regulation 29 CFR 1910.146.

All confined spaces should be identified and a program should be instituted. The program should include proper monitoring techniques, a written program, training of employees engaged in confined space functions, and emergency response techniques. Airline respirators should be worn while working in confined spaces, if monitoring dictates.

LIFT STATIONS

RECOMMENDATION: The stairway leading to the access point above the pit was not guarded with a railing. A standard railing should be installed which will comply with the requirements listed in 29 CFR 1910.24(h). A railing should be installed on any open side of the stairway.

RECOMMENDATION: A direct reading sample was obtained for exposure to hydrocarbons near the openings to the lift station. The first sample was collected through an open hole in the grate. The second sample was collected inside the opening to the underground lift station by holding the direct reading meter at the ground level opening.

The sample results indicated exposures to hydrocarbons were approximately 6,000 mg/m³ and 0.0 mg/m³. OSHA does not have a standard for all hydrocarbons together. The large amount of exposure, taken at the round gate opening, suggests that materials of some nature are present in the pit. No determination was made further into the area. It is suggested that samples be taken prior to any entry into the area and during operations.

RECOMMENDATION: The Indianapolis lift stations and all other lift station locations are confined spaces according to OSHA regulation 29 CFR 1910.146.

All confined spaces should be identified and a program should be instituted. The program should include proper monitoring techniques, a written program, training of employees engaged in confined space functions, and emergency response techniques. Airline respirators should be worn in performing this task.

PRINTING AND REPRODUCTIONS

RECOMMENDATION: Employees were consuming food products at the work area, Room 1308, where chemicals were in use. 29 CFR 1910.141 (g)(2) states, "No employee shall be allowed to consume food or beverages in a toilet room nor in any area exposed to a toxic material." The employees should be limited to a chemical free area for eating and drinking.

RECOMMENDATION: The work processes in the Microfilm Lab, Room 1307, involve the use of corrosive and irritating materials. No emergency shower or eyewash is available to the employees.

Facilities should be provided for an emergency shower and eyewash which is easily accessible to employees. This is required in 29 CFR 1910.151 (c).

RECOMMENDATION: A worker was using Electrostatic Dispersant in Room 1307 to process materials through the copier. There was no Material Safety Data Sheet (MSDS) available for the product.

The MSDSs should be obtained and kept on file. The employee should be informed of the contents and location of the MSDSs. The requirements are located in 29 CFR 1910.1200 (g)(8).

EQUIPMENT MAINTENANCE - WELDING

RECOMMENDATION: A welder performed his task by placing the galvanized steel posts on the concrete floor and leaned over the work. The existing ventilation is a ceiling fan several feet away from the worker.

Indoor welding involving zinc-bearing base of filler metals must be performed with local mechanical exhaust ventilation. The fan in the ceiling alone would not be effective in reducing exposure to the employee during the winter months.

RECOMMENDATION: The workers use respiratory protection in performing some welding operations. The workers have not been trained in the use, care and maintenance of the respirators. Also, there is no written program in place.

The written respiratory protection program should be prepared and all employees using respirators should be trained as soon as possible. The requirements for an acceptable program are located in 29 CFR 1910.134 (b). The requirements for training and fit-testing are found in 1910.134(e)(5)(i).

RECOMMENDATION: The worker performing the welding operation was monitored for exposure to welding fume. The sample was collected on pre-weighed PVC filters and was analyzed by the laboratory that supplied the sample media. The sample was collected on the shoulder of the employee. The exposure results indicate an exposure amount of 2.1 mg/m^3 during a 19 minute sampling period. The worst case of exposure would be if the worker performed the task for an 8 hour day. For the purpose of this study the above exposure is assumed to be the Time-Weighted Average (TWA) exposure. When compared to the listed Permissible Exposure Limit (PEL) of 5.0 mg/m^3 it is determined that the worker was not exposed to amounts the above the legal limit. The operation was measured in the summer months when the temperature was warmer. It is suggested that another sample is taken after the cold weather has returned when the doors and windows of the welding area are closed.

The exposure to this worker was below the PEL for welding fume. However, the exposure is close to 1/2 of the PEL for welding fume. It is suggested that these exposures be considered as overexposures due to the low PEL values. OSHA has

determined that the exposures must be controlled by engineering and/or administrative means first, if an overexposure occurs. The use of respiratory protection may be used to protect the worker during the implementation of controls or to supplement the controls for the complete protection of the employee. One method of reducing the exposure would be better air flow to reduce the exposures. The listed OSHA PEL's are located in 29 CFR 1910.1000.

RECOMMENDATION: A welder was using Washington Alloy Co. heat No. 204306 welding wire to weld sign posts. There was no Material Safety Data Sheet (MSDS) available.

The MSDS should be obtained and kept on file. The employee should be informed of the contents and location of the MSDS. The requirements are located in 29 CFR 1910.1200 (g)(8).

TEST LABORATORY ACTIVITIES

RECOMMENDATION: A container of calcium carbide, a flammable, water reactive solid was improperly stored. Water lines were mounted on the ceiling about ten feet above the material. Acetylene, a flammable gas, is released if water contacts calcium carbide.

The calcium carbide should be stored, segregated from sources of water, in a flammable materials storage cabinet complete with a moisture indicator, which will provide a warning should water be present in the area of the cabinet. 29 CFR 1910.253(g)(2) requires that calcium carbide be stored in metal, water- and air-tight packaging. The package should have a screw top and be conspicuously marked "Calcium Carbide - Dangerous If Not Kept Dry".

RECOMMENDATION: An electrical outlet and a fan located in the Mix Design Lab near the asphalt extraction process are not intrinsically safe. The extraction process involves the use of flammable materials.

An intrinsically safe electrical outlet and fan should be installed as required by 29 CFR 1910.106 (e)(6) which states, "Adequate precautions shall be taken to prevent the ignition of flammable vapors. Sources of ignition include but are not limited to open flames; lightning; smoking; cutting and welding; hot surfaces; frictional heat; static, electrical, and mechanical sparks; spontaneous ignition, including heat-producing chemical reactions; and radiant heat." It is recommended that the outlet and fan be replaced with intrinsically safe appliances.

RECOMMENDATION: Flammable materials were stored on open wood shelving in the Mix Design Lab.

These materials should be stored in an approved flammable materials storage cabinet as required by 29 CFR 1910.106(d)(3).

RECOMMENDATION: Red containers of Bioact were left uncapped in the Mix Design Lab. A fifty-five (55) gallon drum of Bioact was not closed during storage in the south end of the Satellite Storage Area.

As a good work practice, these cans should be capped between uses. This procedure will prevent unnecessary exposure to vapors of toluene and other organic solvents present in the Bioact that could escape through the uncapped container. This is referenced in 29 CFR 1910.106 (e)(2)(ii).

RECOMMENDATION: A vent located in the Liquid Asphalt Lab near the hood is not functioning properly. The air face velocity of the vent is zero.

Measurements were taken with an Anor velometer. The average cross section velocity of the booth was 37.5 feet per minute (fpm). The manufacturer's recommendation for the velocity of the booth should be consulted to determine if this air flow is effective. It is recommended that a flow of 60 - 100 fpm be maintained.

RECOMMENDATION: Chromic acid is used in the Still Operation. The operator has not been given a nasal septum examination.

An annual nasal septum examination is suggested for any person using chromic acid or chromate compounds. This is required by 29 CFR 1910 Table Z-2 with reference to ANSI Z37.7-1971.

RECOMMENDATION: 1,1,1-trichloroethane (TCE), a flammable material, was being transferred from a fifty-five (55) gallon drum to a portable container in the Satellite Storage Area. The two containers were not electrically bonded or grounded during the transfer of material.

29 CFR 1910.107(e)(9) states that "whenever flammable or combustible liquids are transferred from one container to another, both containers shall be effectively bonded and grounded to prevent discharge sparks of static electricity." The containers could be electrically connected to each other and to the ground through the use of jumper cables or a metal floor plate which is large enough for both containers and is itself electrically grounded.

RECOMMENDATION: Four compressed gas cylinders, located in the Satellite Storage Area are not labeled as to their contents.

29 CFR 1910.253 requires that all compressed gas cylinders be permanently marked so their contents may be identified. Whenever possible, the label should be

located on the shoulder of the cylinder. The information on the label must comply with the Hazard Communication Standard requirements of 1910.1200 (f)(5).

RECOMMENDATION: A two week supply of rubbing alcohol, used to clean the rammer shaft, is stored in a wooden box above a cabinet in the Soils Lab.

The maximum allowable volumes of flammable materials stored in portable containers are located in 29 CFR 1910.106(d); Table H-12. Bulk storage of flammable materials should be contained to a flammable materials storage area. As a good work practice, work location storage volumes should be limited to a one day supply of flammable materials.

RECOMMENDATION: The workers use respiratory protection in performing some of the operations at the facility. The workers have not been trained in the use, care and maintenance of the respirators. Also, there is no written program in place.

The written respiratory protection program should be prepared and all employees using respirators should be trained as soon as possible. The requirements for an acceptable program are located in 29 CFR 1910.134 (b). Employees must be trained and fit tested to ensure adequate protection is being provided by the respirator. These requirements are located in 29 CFR 1910.134 (e)(5)(i).

RECOMMENDATION: Laboratory employees performing a variety of analysis tasks were monitored. Samples were obtained for benzene, toluene, n-hexane, hydrocarbons, and coal tar pitch volatiles. The samples were collected on charcoal tubes or glass fiber filters and were analyzed by the laboratory that supplied the sample media. The samples were collected on the shoulders of the employees. The worst case of exposure would be if the workers performed the tasks for an 8 hour

day. For the purpose of this study the exposures are assumed to be the Time-Weighted Average (TWA) exposure, unless otherwise indicated.

The exposure results were compared to the listed Permissible Exposure Limits (PELs). The exposures to these workers were below the PELs for all of the sampled chemicals. However, the exposure during the tapping process was greater than 1/2 of the PEL for the chemical. It is suggested that these exposures be considered as possible overexposures due to the low PEL values. OSHA has determined that the exposures must be controlled by engineering and/or administrative means first, if an overexposure occurs. The use of respiratory protection may be used to protect the worker during the implementation of controls or to supplement the controls for the complete protection of the employee. The listed OSHA PEL's are located in 29 CFR 1910.1000.

RECOMMENDATION: As a general rule, when a chemical having a particular hazard is no longer stored in a container, the hazard warning labels pertaining to that chemical should be removed or painted over. This procedure will insure that false information is not conveyed.

RECOMMENDATION: A label containing the information required in 29 CFR 1910.1200(f)(5) should be placed on the outside of the parts cleaner. This will allow for identification at all times.

RECOMMENDATION: A direct reading sample was obtained for exposure to 1,1,1-Trichloroethane during the washing operations in the South room of the laboratory. A sample was also obtained for hydrocarbons during the mixing and rinsing of Bioact.

The sample results indicate an exposure to 1,1,1-Trichloroethane of approximately 50 parts per million (ppm). The OSHA Permissible Exposure Limit (PEL) is 350 ppm TWA and 450 ppm STEL. The sample results for the total hydrocarbons was 3,000 mg/m³. OSHA does not have a standard for all hydrocarbons together. It is suggested that further testing be performed when the new ventilation modifications are completed in the work area.

RECOMMENDATION: A direct reading sample was obtained for exposure to 1,1,1-Trichloroethane during the washing operations in the South room of the laboratory. A sample was also obtained for hydrocarbons during the asphalt extraction process using the cleaner Excel Clean HD. This cleaner is composed of approximately 75-95 % Citrus terpenes. The asphalt mix was LPA AC 20, manufactured by Ashland Chemical. One detector tube for Ammonia was utilized. The result for possible exposure to Ammonia was 0.0 ppm.

The sample results indicate an exposure to 1,1,1-Trichloroethane was undetected. The reduction in exposure may be due, in part, to the addition of an exhaust hood. This hood surrounds the cleaning area and pulls materials away from the worker. The OSHA Permissible Exposure Limit (PEL) is 350 ppm TWA and 450 ppm STEL. The sample results for the total hydrocarbons was 17,500 mg/m³. OSHA does not have a standard for all hydrocarbons together. There is a recommendation for Asphalt fume issued by the American Conference of Governmental Industrial Hygienists (ACGIH). The recommended Threshold Limit Value is 5.0 mg/m³. There are some chemicals, such as 50% or greater mixes of benzene, which will affect the accuracy of the tube. The difference in readings between the dates of July 1992 and July 1993 may be due to the difference in cleaning materials. The cleaner used on July 13, 1992, was BIOACT. There may also be some interference from the terpene chemicals found in the cleaning materials. The exposure to the employee

may not be serious because of the limited number of tests and the amount of time that the procedure requires. A material also containing terpenes, produced a high exposure reading when tested at the EMEP office.

It is suggested that more accurate measurements be obtained during the asphalt extraction process. The specific chemicals to be tested should include asphalt fume, benzene and terpenes. The employee should continue to utilize the fan in the area. It is recommended that an exhaust hood be designed for this operation. Until the engineering/administrative controls are completed, the employee should use an appropriate respirator during the extraction process. Employees should be tested at laboratories which use the BIOACT and at laboratories which use the Excel Clean HD.

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