Wanatah, IN Scoping Meeting; April 13, 2016

STATEMENT

Based on all of the information provided here, I really cannot see how sacrificing a few hundred farms, a couple of thousand people, thousands of productive acres of land and food and water sources to millions and generations of wildlife and aquatic life, natural resources and general health of the population for hundreds of miles will justify a handful of peoples profits.

My wife and I lived in Chicago all our lives, I worked for BNSF and we lived in close proximity to the rail yards. When my son was born he had a multitude of life threatening medical problems including cardiac failure and severe respiratory disease. As he got older he deteriorated to the point where his status now is "respiratory failure", he is oxygen dependent 24/7, and he must sleep with a ventilator at night for support. My wife also carries a diagnosis of asthma. I myself am diesel exhaust sensitive. ***This paragraph alone is reason enough not to allow these hazardous emissions in this area.***

Myself and my family, my neighbors and my friends cannot understand how anyone could put themselves or their profits ahead of anyone else's well-being. Some of the people I speak of are poor, they are just getting along. Some of the others are wealthy but we all share one common belief....WE DON'T HURT OTHERS TO HELP OURSELVES.

Unless this project has a plan to change nature and its events such as wind and rain, to remove the related hazards to all of us, clearly there is no benefit for anyone from Wisconsin, Illinois or Indiana. Any jobs created by this regardless of the income to the individual or the family cannot remove the sorrow or guilt they will feel in the future for what they thought was a good idea in the past.

Vincent Kuznicki
340 S. 350 W.
Valparaiso, IN 46385
219-242-4751

WHY?

Bypass Chicago 60 miles or more south of city.
Intersecting major interstates highways 90, 80N, 57, 65, 80E to create intermodal yards.
Larger pollution problems than regular RR.
To create a R.R. toll way some R.R. such as IHB not included. If such smaller R.R. will be excluded from this new venture in the rail industry, it seems to me from a business perspective that if I could direct freight around these smaller companies I would effectively put them out of business. Then as a businessman I would be obligated to help the community around these smaller railroads by purchasing their rails and right-of-ways for pennies on a dollar. No permits and no IMPACT studies would be required because the freight that I would now be moving on these rails would just be business as usual.

From the late 60's through the early 70's we were interested in nuclear energy, cheap clean energy. These reactors had finite life cycles. The move now leads toward decommissioning these power plants. Subsidies are not there for these forms of energy. We now support wind and solar. Eventually we will have to move contaminated items and spent fuel rods to storage facilities. Therefore, viewing the location of the GLBT line I would say if I were a businessman I would be setting myself up for some nice profits in the future.

Though I see no mention of intermodal yards, one would have to assume that if we are building a rail system which intersects major interstates where truck stops are nearby and land is available, that surely intermodal yards would be next considering no IMPACT study would be necessary since the railroad would already have a permit to do business as a railroad which includes intermodal. A statement was made by the founder of this venture that even though the capacity of this rail would be 110 trains per day that does not mean they would run that many trains. Railroad history and my personal experience working for railroads states that railroads run at full capacity and beyond because after all without profits we cannot pay investors and as businessmen we cannot pay ourselves. It would be very hard to attract an investor when you tell them our intention is to run at less than capacity.

VINCENT KUZNICKI
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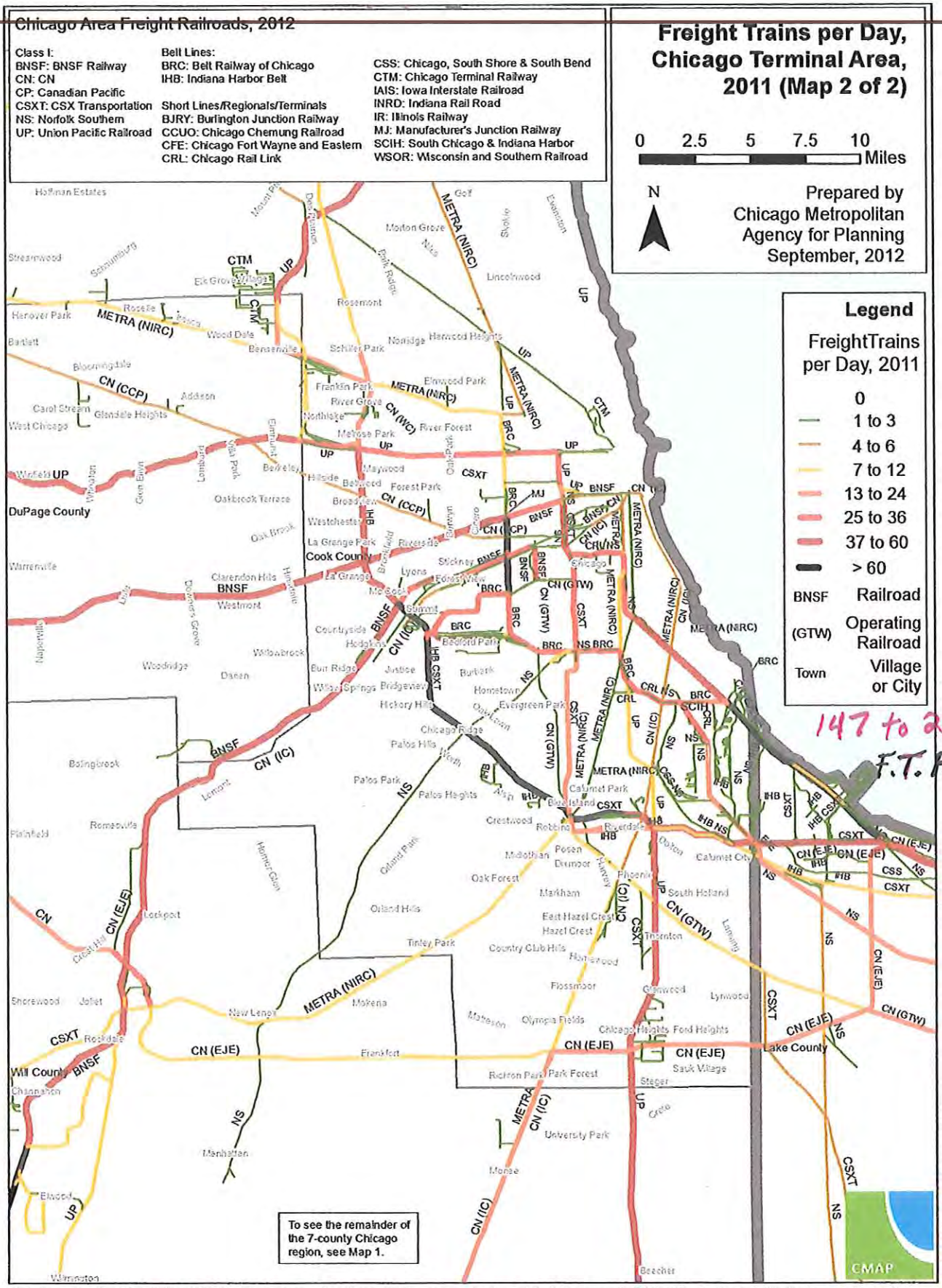
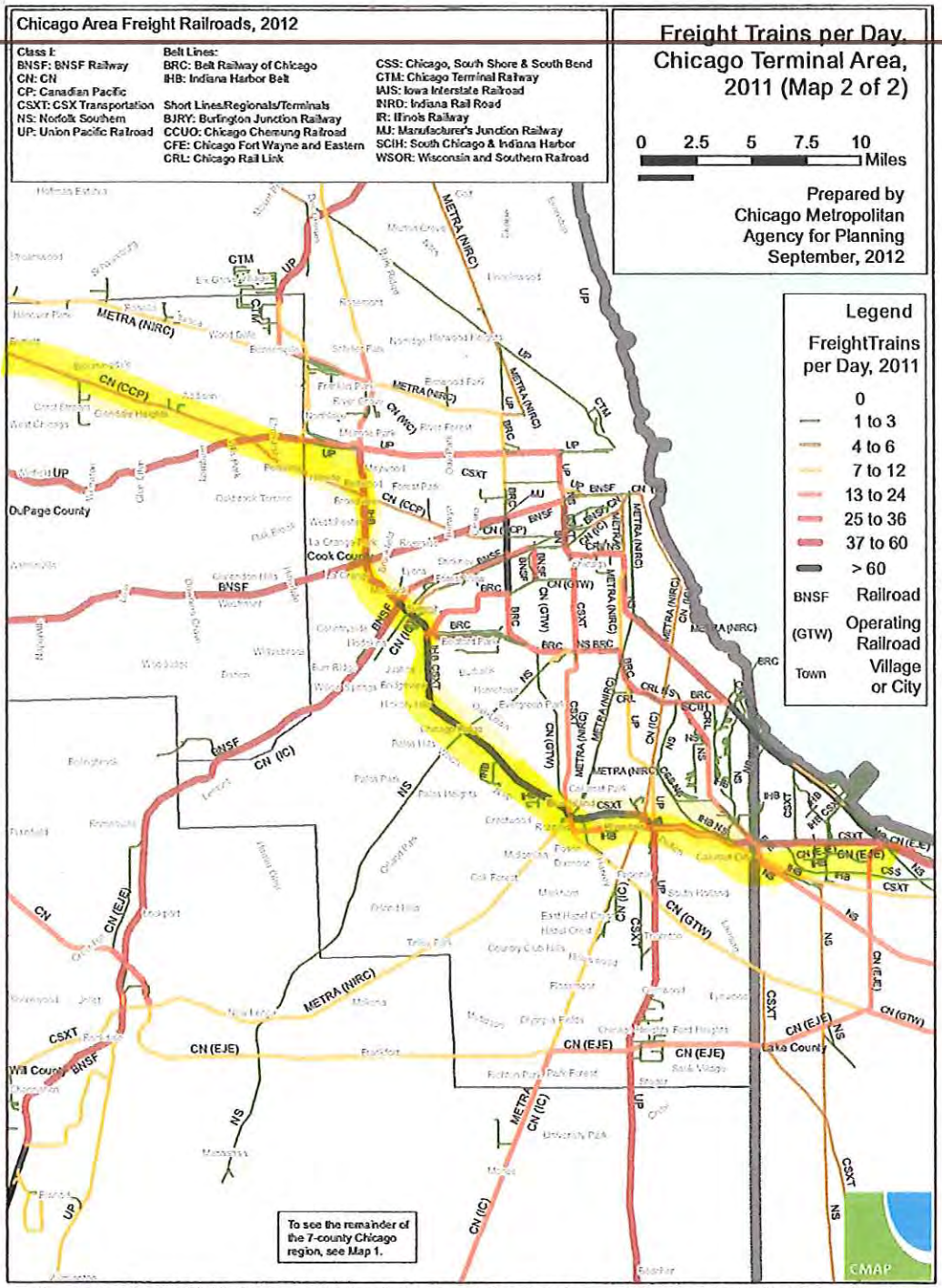


147 to 201
F.T.P.D.

Estimate by CMAP, 2012. Sources: National Transportation Database, 2011, Updated with information from createprogram.org, Illinois Commerce Commission Grade Crossing Database, Google Earth, personal communications. Missing data was interpolated.

Note: Figures include overhead trackage rights for many railroads, including Metra, the regional commuter railroad.

See http://www.cmap.illinois.gov/freight-snapshot.



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EXISTING BY PASS OF CHGO -

147 to 201 FRIEGT TRAINS THROUGH CHGO PER DAY

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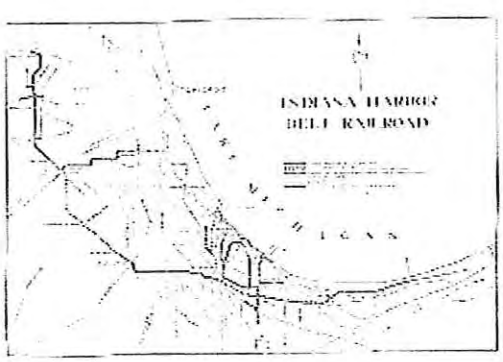

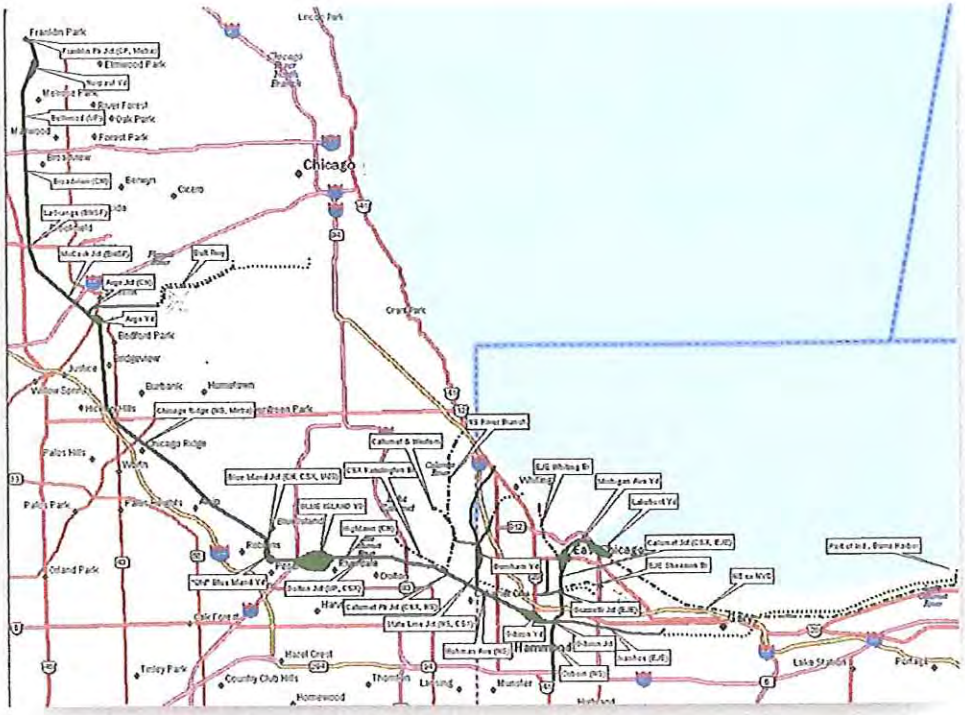

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SAVE MONEY & TIME FOLLOW THE GREEN LINE. ADD SOME TRACK AND KEEP BUILDING TO LAPORTE!

Chicago at heart of crude oil shipments, data show

A crude oil train sits on tracks in Chicago's Pilsen neighborhood on April 3, 2015. The high volume of volatile crude traveling through the area has raised concerns, and senators from six states recently urged federal regulators to act soon to approve tighter safety restrictions. (Abel Uribe, Chicago Tribune)

By **Richard Wronski · Contact Reporter**
Chicago Tribune

APRIL 3, 2015, 6:43 PM

More highly volatile crude oil passes through the Midwest, specifically the Chicago area, via railroad tank cars than anywhere else in the country, according to newly released data from the federal government.

The latest information on crude-oil-by-rail movements, the government's first accounting of such shipments, showed that 437,000 barrels of Bakken shale crude oil were shipped daily in January from North Dakota to East Coast refineries.

Since freight moving across the nation is funneled through Chicago, the nation's busiest rail hub, that crude oil is passing through the city and suburbs, experts say.

The volume of crude oil is enough to fill as many as 42 mile-long "unit trains," each with a hundred or

more tank cars, traveling through the area each week. Indeed, such trains have become a common sight throughout the city and suburbs in recent years.

The new data corroborate a Tribune report last Julythat put the number of crude oil trains passing through the region at about 40 a week.

Concerns about the increasing number of crude oil trains have grown as a result of several fiery derailments in Illinois and elsewhere. A BNSF Railway train with 103 tank cars containing Bakken crude derailed and exploded in flames in a sparsely populated area south of Galena on March 5.

If that incident had occurred in the metropolitan area, thousands of people would have been forced to evacuate and enormous damage could have resulted, officials said.

The federal government's release of the data was welcomed by local officials and activists concerned about crude oil shipments passing through their communities.

"There has been some uncertainty as to how much crude was crossing the country," said Tom Weisner, the mayor of Aurora and the co-chair of a municipal coalition that has raised concerns about the trains and the safety of the tank cars that carry the oil and other hazardous materials. "Having an accurate accounting will certainly help the discussion on increasing safety along the rails."

Charles Paidock, a leader of the Chicago Greens, a grass-roots group of environmental activists, was surprised that the volume of oil isn't higher.

"We are the rail capital of the Midwest," Paidock said. "It seems a little low. The railroads will not reveal the number of trains. They won't say what's going on."

The railroad industry says it has taken steps to ensure safe shipments.

"Route selection, train speeds, track inspections and the training of personnel all reflect today's high standards established to move (crude oil) safely," according to the Association of American Railroads.

In the wake of the derailment near Galena and other incidents, the BNSF said this week it was taking additional safety measures for crude oil shipments. These include slowing crude oil trains to 35 mph in cities with more than 100,000 people and increasing track inspections.

But the harshest critics call the crude-by-rail shipments "bomb trains," primarily because of concerns about the ability of the tank cars to withstand derailments.

More than 1 million barrels of crude oil move by train across the U.S. every day, according to the U.S. Energy Information Administration. The new numbers, taken from industry and government reports,

were released for the first time in order to provide "key insights" into oil-by-rail movements, the agency said.

"The new crude-by-rail data provides a clearer picture on a mode of oil transportation that has experienced rapid growth in recent years and is of great interest to policymakers, the public and industry," agency Administrator Adam Sieminski said in a statement.

Previously, comprehensive data on oil shipments have been hard to come by, with much information considered confidential by the industry and not disclosed publicly.

The agency data show that crude oil movements have increased significantly over the past five years. Bakken oil production has increased by more than 1 million barrels per day since 2010, up from 55,000 barrels in 2010, the agency said. Currently, 70 percent of Bakken production is transported by rail.

But while the growing crude-by-rail shipments have become a vital part of the U.S. oil business, the federal government and the petroleum and rail industries have been slow to respond to safety concerns, critics say.

Senators from six states that see a high volume of crude oil shipments, including Dick Durbin of Illinois, last week urged federal regulators to act soon to approve tighter safety restrictions for rail-transported crude. In a letter to the U.S. Office of Management and Budget, the senators said the effort to enact stricter guidelines has been slowed by the OMB's bureaucracy.

Last year the U.S. Department of Transportation proposed regulations that called for reducing train speed, better tank car design standards, enhanced communication with local first responders and the phasing out of the older, less sturdy DOT-111 tank cars from carrying the most volatile type of crude within two years. But the OMB has yet to approve the new standards and missed a congressionally mandated January deadline.

In a previous letter to the OMB, Durbin cited "tank car weakness" in the Galena derailment as well as in two other derailments involving ethanol shipments: in 2009 in Cherry Valley, near Rockford, in which a woman was killed, and in the central Illinois town of Tiskilwa in 2011.

The most devastating incident occurred in Lac-Megantic, Quebec, in July 2013 when a train carrying crude oil derailed and exploded, wiping out dozens of buildings and killing 47 people.

The 437,000 barrels of crude oil cited by the new report would fill about 624 tank cars. A single crude oil rail car can carry about 680 to 720 barrels of crude oil. Many so-called "unit trains" haul at least 100 tank cars.

The Energy Information Administration data track the movement of crude oil by rail across five regions of the country. While the data don't show the exact routes taken by each shipment, industry experts point to Chicago as the transfer point for rail shipments from the west to the East Coast.

Documents obtained by the Tribune last year showed that as many as 40 crude oil trains roll through the Chicago area weekly. The major freight railroads disclosed the information to the Illinois Emergency Management Agency.

The state agency redacted information showing the specific routes the trains take through each Illinois county, even though the tracks each railroad owns and operates on are generally known and readily identifiable to the public.

The records show that as many as 30 trains a week travel through Kane, DuPage and Cook counties on the BNSF Railway. The BNSF tracks run through suburbs from Aurora and Naperville to Cicero and into Chicago.

Canadian National Railway reported it runs five to seven crude oil trains a week through Will, Cook and DuPage counties. The CN says those trains originate on the BNSF.

An average of four Canadian Pacific crude oil trains pass through Lake, Cook and DuPage counties weekly, the railroad said. The Union Pacific reported up to two trains a week through Cook and Will counties.

Although the primary haulers of Bakken crude oil into Illinois are the BNSF, Union Pacific and Canadian Pacific, trains are turned over in Cook County to CSX Transportation and Norfolk Southern railroads before continuing to East Coast refineries, according to the BNSF and industry experts.

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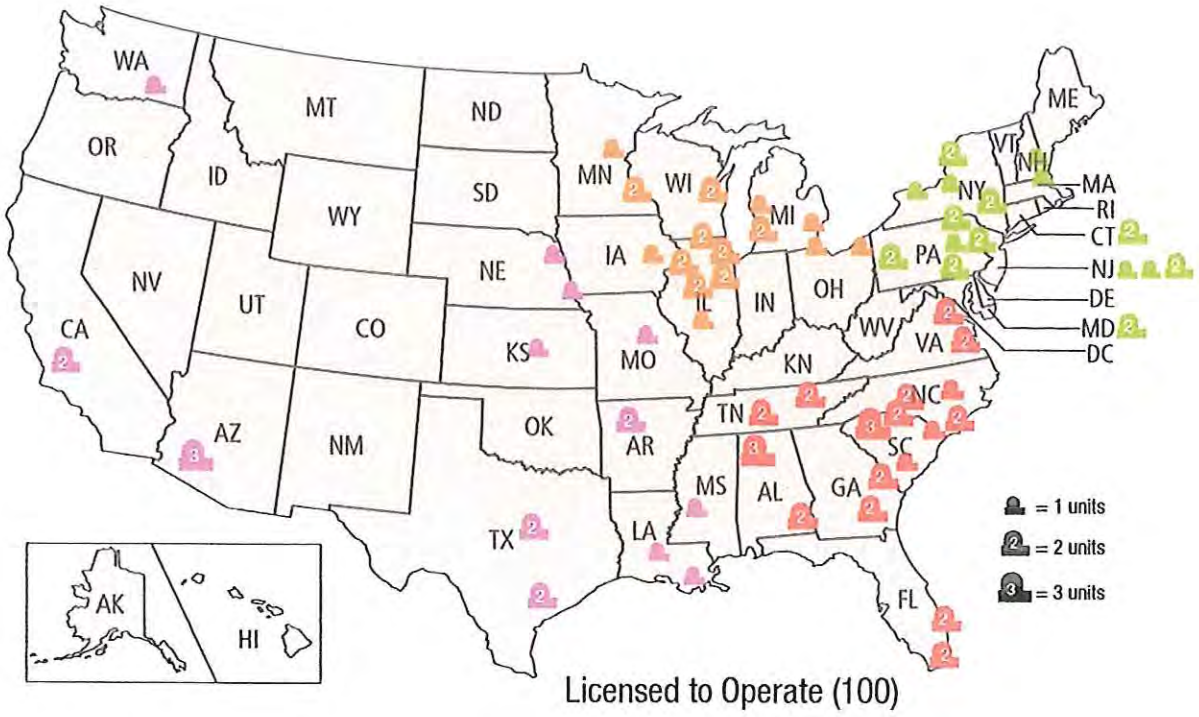
U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Map of Power Reactor Sites

List of Power Reactor Units

U.S. Operating Commercial Nuclear Power Reactors



Licensed to Operate (100)

Page Last Reviewed/Updated Friday, November 13, 2015

CONSTRUCTION

Foundations have to be laid down prior to road bed for tracks as seen in attached pictures by Hydrex. Also included in the paperwork from Hydrex are instructions on safety issues which arise from building a railroad. These safety issues arise from the use of granite, slate and other rock and stone materials. This region has a lot of sandy loam soil, excellent for farming, recreation but not so excellent for supporting millions of pounds in motion. Depending on the load which the soil is able to take engineers will be able to factor in how deep and how wide the foundation of powdered granite will be. These raw materials will need to be hauled in by trucks. Semi dumps range 18 to 20 yards, 82,000 gross lbs. capacity. Impact on roads never designed for this weight and amount of traffic will wreak havoc on the areas road network. Those doing the construction and damage to our roadways will not consider themselves responsible so repair or replacement of roads will fall on local communities.

Along with these materials comes the hazard of free silica, a dust of crystalline nature. Particles of this silica will be inhaled by people for miles around, livestock for miles around and this dust will remain on the ground so when people perform mundane tasks such as mowing their lawn, gardening, drying their laundry outside will be constantly re-exposing them to this hazard. Silica creates Silicosis (which forms lesions in the lungs and also leads to lung cancer and fibrosis of the lungs (for which there is no known treatment or cure). Refer to attached information from Hydrex and OSHA.

VINCENT KUZNICKI

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219-242-4751

HYDREX

INNOVATIVE SOLUTIONS NATIONWIDE

Exposure to silica and other respirable inhalants from rail ballast materials.

Hydrex (now NDS-Plant)

Hydrex provide tailored support service solutions to the UK rail market with over 25 years' experience in working with major rail contractors. Hydrex can offer:

- Road Rail Vehicle (RRV) supply – as well as the ability to utilise their plant operators licence
- On-track solutions - covering all aspects of track maintenance, renewals, and enhancements
- Off-track civils - including piling, drainage, vegetation clearance, earthworks, and waste management
- Support for overhead line equipment (OLE) and signalling

Silica dust in rail ballast – what is the problem?

Hydrex were alerted by a ballast supplier to the potential for their track workers to be exposed to silica dust and other respirable hazards in the course of their work in moving and handling rail ballast.

What is silica and where can it be found?

Silica is a very common mineral found in sand and rocks such as granite, sandstone, flint and slate, which can be found in ballast. When these rocks are cut, broken, drilled or crushed a fine silica dust can be produced which is hazardous to health when inhaled. Employees who work with these materials are at potential risk of developing silicosis as a result of their exposure to silica

How does it affect health?

Silicosis is a completely preventable but incurable respiratory disease which is, fortunately, now rare in the UK. It is caused by inhaling silica dust (specifically respirable crystalline silica). If this dust is inhaled, small particles of it can become embedded into parts of the lung and cannot be cleared by mucous or coughing. The dust is toxic to the lining of the lungs causing a strong inflammatory reaction. Eventually, this causes the lung tissue to become irreversibly thickened and scarred - a condition known as fibrosis. This scar tissue prevents the lungs from taking in oxygen properly.

Exposure to very high levels of silica can cause disease within a year, but it usually takes at least 10 - 15 years of exposure before symptoms occur. The longer the interval between exposure and the onset of symptoms, the slower the disease tends to progress. All types of silicosis cause damage to the lung tissue.

Symptoms include a cough, which is sometimes dry, fatigue, shortness of breath, chest tightness and pain and loss of appetite. Patients may lose weight, have severe trouble breathing and cough up blood as the disease progresses. People who have silicosis are also

more susceptible to other respiratory diseases such as tuberculosis. There may also be an increased risk of lung cancer in workers who have been exposed to silica.

Sources of silica dust - ballast on the railways

Good ballast materials are angular, crushed, hard stones and rocks, uniformly graded, free of dust and dirt. Ballast can be found made up of materials such as granite, basalt, limestone, slag and gravel. All ballast has to meet the requirements of BS EN 13450 (2005).

One of the main functions of ballast is to retain track position from forces placed upon on the railway track both from the trains and tamping. When silica containing materials are crushed or abraded e.g. during tamping, or stone blowing, there is the risk that silica crystals can be released in a range of sizes. A proportion of them can be sufficiently small that if inhaled they evade the human body's natural air cleaning systems and can therefore penetrate deep into the lung. These respirable crystals are known to present the hazards associated with occupational disease.

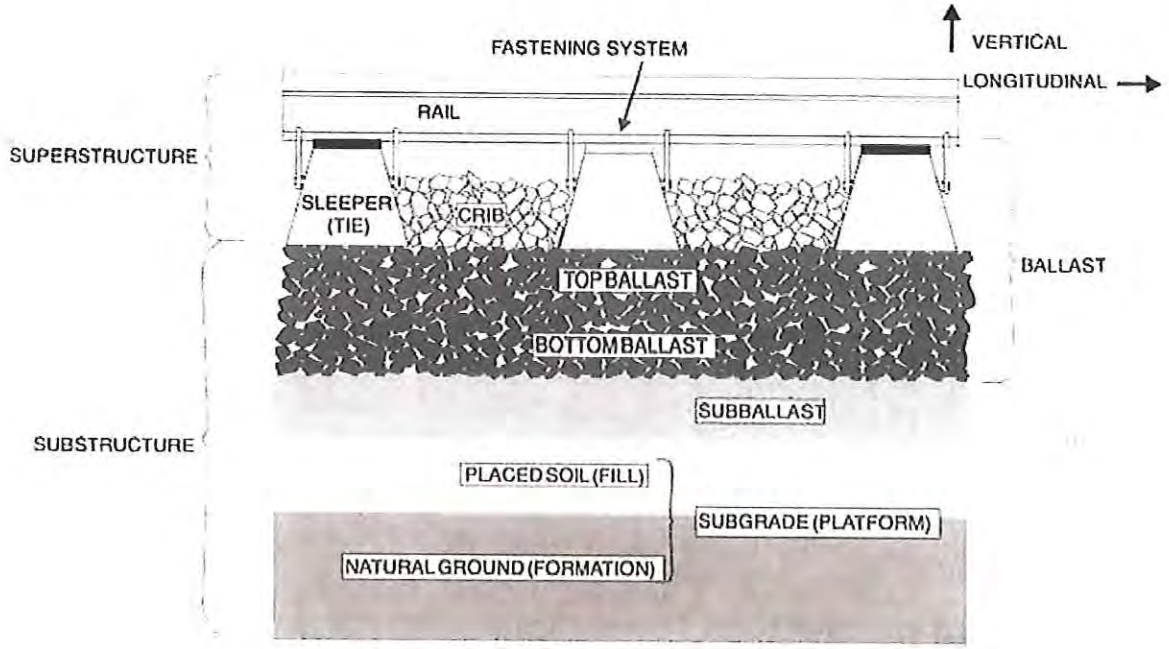

Figure1. Track layout of a typical ballasted track- side view (Selig & Waters, 1994).

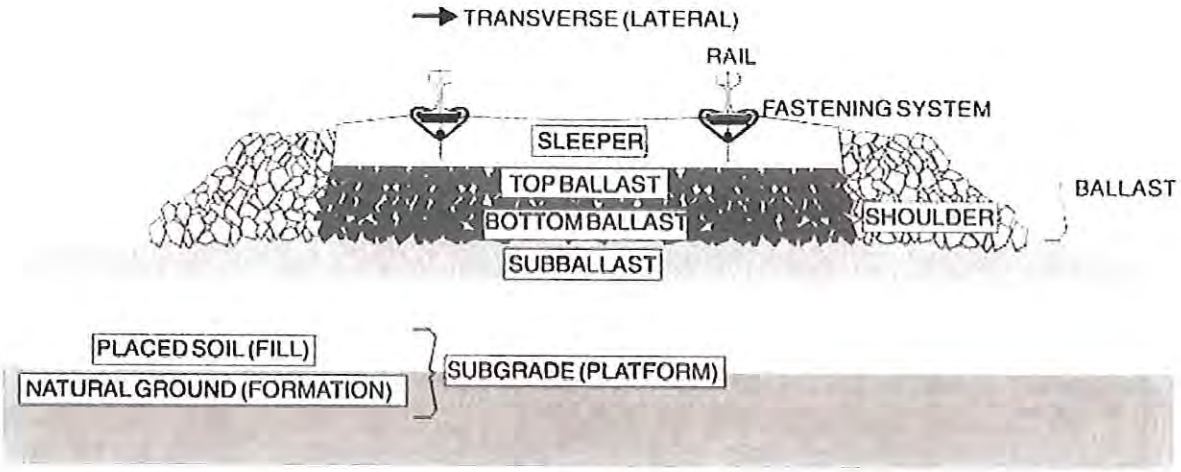

Figure2. Track layout of a typical ballasted track –cross section (Selig & Waters, 1994)

Exposure to ballast dust can occur during the removal of the old ballast and the dropping and profiling of the new ballast on to the track. Older ballast removed from the track bed is normally worn and may be contaminated with oil, meaning that dust levels are generally low. The new ballast removed from wagons and spread onto the track may produce larger amounts of dust, dependent on whether the ballast is dry and how much is being used.

Hydrex response –assessing workers' exposure by dust monitoring

Hydrex was keen to be proactive and minimise any of the associated health risks to their employees from ballast handling, such as silicosis. They undertook a risk assessment and requested atmospheric dust sampling to be undertaken at trackside locations in order to assess the extent of employees' exposure to dust, including respirable silica, and to confirm the adequacy of controls. Atmospheric dust monitoring was conducted by an accredited agency at theTarmac Bescot recycling site in July 2010 and Hydrex ballast work site in Crewe on in June 2011. Each sampling exercise involved 4 employees (engineers and plant machine drivers) and dust samples collected were analysed for total inhalable and respirable dust, as well as for metal contamination and silica content. A further survey for atmospheric dust monitoring was carried out at the Atherton, Manchester site in August 2011 during the track works involving scarifying the surface (skim digging of ballast).

Results

The sampling results for all three sites for total inhalable and respirable dust were within the relevant workplace exposure limits (WELs). The analysis of the filters for silica and metal contamination were all well below the workplace exposure limits. However it was noted that damp weather conditions prior to and on the night of monitoring at Atherton were such that dust production would be likely to be much reduced.

Employee exposure to silica dust was controlled by use of respiratory protective equipment (RPE) as well as air conditioning in the machine drivers' cabs[1].

Future actions

Hydrex plan to continue to monitor dust exposures from ballast handling, with additional sampling surveys to be arranged during dry spells when dust levels may be higher.

The business benefits of managing exposure to silica in ballast dust

This case study clearly shows the importance of a proactive approach to managing all potential significant health risks, in order to safeguard railway workers from ill health and ensure legal compliance. It may also serve to reduce the risk of litigation and the significant associated costs. A substantial claim has been settled recently to cover the cost of an employee diagnosed with silicosis to cover his lost earnings and also provide for his care when the condition deteriorates.

According to Ian Bailey, an industrial injury lawyer with Irwin Mitchell in Leeds, there are now less than 100 new cases of silicosis being diagnosed each year, but this is still far too many. This is still 100 workers whose lives are being ruined because proper precautions were not taken to minimise the risk of exposure.

References:

EH40 Workplace Exposure Limits 2005 Health and Safety Executive

Wee Loon Lim: 2004 Mechanics of Railway Ballast Behaviour

[1] ORR footnote: Under the COSHH Regulations priority should be given to provision of engineering and technical controls before relying on RPE. Where RPE is needed to control residual risk it should provide adequate protection and be compatible with the requirements of the work including other protective equipment. Where exposures to respirable silica are significant (over half the WEL) RPE to FFP3 standard will generally be appropriate – guidance publication HSG 53 provides further guidance on RPE selection.

Vulcan Materials Company

SAFETY DATA SHEET

Effective Date: 06/01/2015
Replaces 05/01/2012

Granite

1. Identification

Product name:
Granite

Other means of identification/Synonyms/Common Names:
Aggregate, Manufactured Sand, Fine Filler

Recommended use:
Granite is used as a construction material.

Recommended restrictions:
None Known

Manufacturer/Contact info:
Vulcan Materials Company and its subsidiaries and affiliates
1200 Urban Center Drive
Birmingham, AL 35242

General Phone Number:
1.866.401.5424

Emergency Phone Number:
1.866.401.5424 (3E Company, 24hours/day, 7 Days/week)

Website:
www.vulcanmaterials.com

2. Hazard(s) Identification

Physical hazards:
Not Classified

Health hazards:
Carcinogenicity-Category 1A
Specific target organ toxicity, repeated exposure- Category 2

Signal word:

Danger

Hazard statement:
May Cause Cancer (Inhalation).
Causes damage to organs (lungs, respiratory system) through prolonged or repeated exposure (inhalation)

Precautionary statement:

Prevention

- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Use personal protective equipment as required. Wear protective gloves, protective clothing, eye protection, and face protection.
- Wash hands thoroughly after handling.
- Do not eat, drink or smoke when using this product.

Response

- If exposed or concerned get medical advice/attention.

Disposal

- Dispose of contents/container in accordance with all local, regional, national, and international regulations.

Supplemental information:
Respirable Crystalline Silica (RCS) may cause cancer. Granite is a naturally occurring mineral complex that contains varying quantities of quartz (crystalline silica). Granite may be subjected to various natural or mechanical forces that produce small particles (dust) which may contain respirable crystalline silica (particles less than 10 micrometers in aerodynamic diameter). Repeated inhalation of respirable crystalline silica (quartz) may cause lung cancer according to IARC, NTP; ACGIH states that it is a suspected cause of cancer. Other forms of RCS (e.g., tridymite and cristobalite) may also be present or formed under certain industrial processes.

3. Composition/information on ingredients

Chemical name	CAS number	%
Granite	None	100
Quartz (crystalline silica)	14808-60-7	>1

4. First-aid measures

Inhalation:
Remove to fresh air. Dust in throat and nasal passages should clear spontaneously. Contact a physician if irritation persists or if breathing is difficult.

Eyes:
Immediately flush eye(s) with plenty of clean water for at least 15 minutes, while holding the eyelid(s) open. Occasionally lift the eyelid(s) to ensure thorough rinsing. Beyond flushing, do not attempt to remove material from eye(s). Contact a physician if irritation persists or later develops.

Skin:
Wash affected areas thoroughly with mild soap and fresh water. Contact a physician if irritation persists.

Ingestion:
If person is conscious do not induce vomiting. Give large quantity of water and get medical attention. Never attempt to make an unconscious person drink.

Most important symptoms/effects, acute and delayed:
Dust may irritate the eyes, skin, and respiratory tract. Breathing silica-containing dust for prolonged periods in the workplace can cause lung damage and a lung disease called silicosis. Symptoms of silicosis may include (but are not limited to) shortness of breath, difficulty breathing with or without exertion; coughing; diminished work capacity; diminished chest expansion; reduction of lung volume; right heart enlargement and/or failure.

Indication of immediate medical attention and special treatment needed:
Not all individuals with silicosis will exhibit symptoms of the disease. However, silicosis can be progressive, and symptoms can appear at any time, even years after exposures have ceased. Persons with silicosis have an increased risk of pulmonary tuberculosis infection.

For emergencies contact 3E Company at 1.866.401.5424 (24 hours/day, 7 days/week).

5. Fire-fighting measures

Suitable extinguishing media:
This product is not flammable. Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media:
None known.

Specific hazards arising from the chemical:
Contact with powerful oxidizing agents may cause fire and/or explosions (see section 10 of SDS).

Special protective equipment and precautions for firefighters:
Use protective equipment appropriate for surrounding materials.

Fire-fighting equipment/instructions:
No unusual fire or explosion hazards noted. Not a combustible dust.

Specific methods:
The presence of this material in a fire does not hinder the use of any standard extinguishing medium. Use extinguishing medium for surrounding fire.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Persons involved in cleanup processes should first observe precautions (as appropriate) identified in Section 8 of this SDS. **For emergencies, contact 3E Company at 1-866-401-5424 (24 hours/day, 7 days/week).**

Environmental precautions:

Prevent from entering into sewers or drainage systems where it can harden and clog flow.

Methods and materials for containment and cleaning up:

Spilled material, where dust is generated, may overexpose cleanup personnel to respirable crystalline silica-containing dust. Do not dry sweep or use compressed air for clean-up. Wetting of spilled material and/or use of respiratory protective equipment may be necessary.

7. Handling and storage

Precautions for safe handling:

Respirable crystalline silica-containing dust may be generated during processing, handling, and storage. Use personal protection and controls identified in Section 8 of this SDS as appropriate.

Conditions for safe storage, including any incompatibilities:

Do not store near food, beverages, or smoking materials.

8. Exposure controls/personal protection

Legend:

NE = Not Established; PEL = Permissible Exposure Limit; TLV = Threshold Limit Value; REL = Recommended Exposure Limit; OSHA = Occupational Safety and Health Administration; MSHA = Mine Safety and Health Administration; NIOSH = National Institute for Occupational Safety and Health; ACGIH = American Conference of Governmental Industrial Hygienists

Component	OSHA/MSHA PEL	ACGIH TLV	NIOSH REL
Particulates not otherwise classified	15 mg/m^3 (total dust) 5 mg/m^3 (respirable fraction)	10 mg/m^3 (inhalable fraction) 3 mg/m^3 (respirable fraction)	NE
Respirable dust containing silica	10 $mg/m^3 \div$ (% silica + 2)	Use Respirable Silica TLV	Use Respirable Silica REL
Total dust containing silica	OSHA: 30 $mg/m^3 \div$ (% silica + 2) MSHA: 30 $mg/m^3 \div$ (% silica + 3)	NE	NE
Respirable Crystalline Silica (quartz)	NE - Use respirable dust PEL	0.025 mg/m^3	0.05 mg/m^3
Respirable Tridymite and Cristobalite (other forms of crystalline silica)	1/2 of OSHA and MSHArespirable dust PEL	0.025 mg/m^3	0.05 mg/m^3

Exposure Guidelines:

Respirable dust and quartz levels should be monitored regularly to determine worker exposure levels. Exposure levels in excess of allowable exposure limits should be reduced by all feasible engineering controls, including (but not limited to) wet suppression, ventilation, process enclosure, and enclosed employee workstations.

Engineering Controls:

Activities that generate dust require the use of general ventilation, local exhaust and/or wet suppression methods to maintain exposures below allowable exposure limits.

Eye Protection:

Safety glasses with side shields should be worn as minimum protection. Dust goggles should be worn when excessively (visible) dusty conditions are present or are anticipated.

Skin Protection (Protective Gloves/Clothing):

Use gloves to provide hand protection from abrasion. In dusty conditions, use long sleeve shirts. Wash work clothes after each use.

Respiratory Protection:

All respirators must be NIOSH-approved for the exposure levels present. (See NIOSH Respirator Selection Guide). The need for respiratory protection should be evaluated by a qualified safety and health professional. Activities that generate dust require the use of an appropriate dust respirator where dust levels exceed or are likely to exceed

allowable exposure limits. For respirable silica levels that exceed or are likely to exceed an 8 hr Time Weighted Average (TWA) of 0.5 mg/m^3, a high efficiency particulate filter respirator must be worn at a minimum; however, if respirable silica levels exceed or are likely to exceed an 8 hr TWA of 5.0 mg/m^3 a positive pressure, full face respirator or equivalent is required. Respirator use must comply with applicable MSHA (42 CFR 84) or OSHA (29 CFR 1910.134) standards, which include provisions for a user training program, respirator inspection, repair and cleaning, respirator fit testing, medical surveillance and other requirements.

9. Physical and chemical properties

Appearance: Angular particles, light salt-and-pepper colored, ranging in size from pebbled to boulders.		
Odor: No odor.	**PH:** Not applicable	**Decomposition temperature:** Not applicable
Melting point/freezing point: Not applicable	**Initial boiling point and boiling range:** Not applicable	**Flash point:** Non-combustible
Evaporation rate: Not applicable	**Flammability:** Not applicable	**Upper/lower flammability or explosive limits:** Not applicable
Vapor pressure: Not applicable	**Relative density:** Not applicable	**Solubility:** 0
Partition coefficient: n-octanol/water. Not applicable	**Autoignition temperature:** Not applicable	**Specific Gravity (H2O = 1):** 2.6 - 2.81

10. Stability and reactivity

Reactivity:
Not reactive under normal use.

Chemical stability:
Stable under normal temperatures and pressures.

Possibility of hazardous reactions:
None under normal use.

Conditions to avoid (e.g., static discharge, shock or vibration):
Contact with incompatible materials should be avoided (see below). See Sections 5 and 7 for additional information.

Incompatible materials:
Silica ignites on contact with fluorine and is incompatible with acids, aluminum, ammonium salts and magnesium. Silica reacts violently with powerful oxidizing agents such as fluorine, boron trifluoride, chlorine trifluoride, manganese trifluoride, and oxygen difluoride yielding possible fire and/or explosions. Silica dissolves readily in hydrofluoric acid producing a corrosive gas – silicon tetrafluoride.

Hazardous decomposition products:
Silica-containing respirable dust particles may be generated. When heated, quartz is slowly transformed into tridymite (above 860°C/1580°F) and cristobalite (above 1470°C/2678°F). Both tridymite and cristobalite are other forms of crystalline silica.

11. Toxicological information

Primary Routes of Exposure:
Inhalation and contact with the eyes and skin.

Symptoms related to the physical, chemical, toxicological characteristics
Inhalation:
Dusts may irritate the nose, throat and respiratory tract by mechanical abrasion. Coughing sneezing and shortness of breath may occur.
Symptoms of silicosis caused by chronic exposure to dust may include (but are not limited to) shortness of breath, difficulty breathing with or without exertion; coughing; diminished work capacity; diminished chest expansion; reduction of lung volume; right heart enlargement and/or failure. Persons with silicosis have an increased risk of pulmonary tuberculosis infection.

Eye Contact:
Dust particles can scratch the eye causing tearing, redness, a stinging or burning feeling, or swelling of the eyes with blurred vision.

Skin Contact:
Dust particles can scratch and irritate the skin with redness, an itching or burning feeling, swelling of the skin, and/or rash.

Ingestion:
Expected to be practically non-toxic. Ingestion of large amounts may cause gastrointestinal irritation including nausea, vomiting, diarrhea, and blockage.

Medical Conditions Aggravated by Exposure:
Irritated or broken skin increases chance of contact dermatitis. Pre-existing medical conditions that may be aggravated by exposure include disorders of the eye, skin and lung (including asthma and other breathing disorders). Smoking tobacco will impair the ability of the lungs to clear themselves of dust.

Delayed and immediate effects and also chronic effects from short- and long-term exposure:
Prolonged overexposure to respirable dusts in excess of allowable exposure limits can cause inflammation of the lungs leading to possible fibrotic changes, a medical condition known as pneumoconiosis.
Prolonged and repeated inhalation of respirable crystalline silica-containing dust in excess of allowable exposure limits may cause a chronic form of silicosis, an incurable lung disease that may result in permanent lung damage or death. Chronic silicosis generally occurs after 10 years or more of overexposure; a more accelerated type of silicosis may occur between 5 and 10 years of higher levels of exposure. In early stages of silicosis, not all individuals will exhibit symptoms (signs) of the disease. However, silicosis can be progressive, and symptoms can appear at any time, even years after exposure has ceased.
Repeated overexposures to very high levels of respirable crystalline silica for periods as short as six months may cause acute silicosis. Acute silicosis is a rapidly progressive, incurable lung disease that is typically fatal. Symptoms include (but are not limited to): shortness of breath, cough, fever, weight loss, and chest pain.
Respirable dust containing newly broken silica particles has been shown to be more hazardous to animals in laboratory tests than respirable dust containing older silica particles of similar size. Respirable silica particles which had aged for sixty days or more showed less lung injury in animals than equal exposures of respirable dust containing newly broken particles of silica.
There are reports in the literature suggesting that excessive crystalline silica exposure may be associated with autoimmune disorders and other adverse health effects involving the kidney. In particular, the incidence of scleroderma (thickening of the skin caused by swelling and thickening of fibrous tissue) appears to be higher in silicotic individuals. To date, the evidence does not conclusively determine a causal relationship between silica exposure and these adverse health effects.

Carcinogenicity:
Epidemiology studies on the association between crystalline silica exposure and lung cancer have had both positive and negative results. There is some speculation that the source and type of crystalline silica may play a role. Studies of persons with silicosis indicate an increased risk of developing lung cancer, a risk that increases with the level and duration of exposure. It is not clear whether lung cancer develops in non-silicotic patients. Several studies of silicotics do not account for lung cancer confounders, especially smoking, which have been shown to increase the risk of developing lung disorders, including emphysema and lung cancer.
In October 1996, an IARC Working Group designated respirable crystalline silica as carcinogenic (Group 1). In 2012, an IARC Working Group re-affirmed that inhalation of crystalline silica was a known human carcinogen. The NTP's Report on Carcinogens, 9th edition, lists respirable crystalline silica as a "known human carcinogen." In the year 2000, the American Conference of Governmental Industrial Hygienists (ACGIH) listed respirable crystalline silica (quartz) as a suspected human carcinogen (A-2). These classifications are based on sufficient evidence of carcinogenicity in certain experimental animals and on selected epidemiological studies of workers exposed to crystalline silica.

Additional information on toxicological-effects:

Acute toxicity: Not classified

Skin corrosion/irritation: Not classified

Serious eye damage/eye irritation: Not classified

Respiratory sensitization: Not classified.

Skin sensitization: Not classified.

Germ cell Mutagenicity: Not classified

Carcinogenicity: May cause cancer (Inhalation).

Reproductive toxicity: Not classified

Specific target organ toxicity - single exposure: Not classified

Specific target organ- toxicity – repeated exposure: Causes damage to organs (lungs, respiratory system) through prolonged or repeated exposure (inhalation)

Aspiration toxicity: Not classified (not applicable- solid material)

12. Ecological information

Ecotoxicity (aquatic and terrestrial, where available):
Not determined

Persistence and degradability:
Not determined

Bioaccumulative potential.
Not determined

Mobility in soil.
Not determined

Other adverse effects.
Not determined

13. Disposal considerations

Safe handling and disposal of waste:
Place contaminated materials in appropriate containers and dispose of in a manner consistent with applicable federal, state, and local regulations. Prevent from entering drainage, sewer systems, and unintended bodies of water. It is the responsibility of the user to determine, at the time of disposal, whether product meets criteria for hazardous waste. Product uses, transformations, mixture and processes, may render the resulting material hazardous.

14. Transport information

UN Number:
Not regulated.

UN Proper shipping name:
Not regulated.

Transport Hazard class:
Not applicable.

Packing group, if applicable:
Not applicable.

Marine pollutant (Yes/No):
Not applicable.

15. Regulatory information

Toxic Substances Control Act (TSCA):

The components in this product are listed on the TSCA Inventory or are exempt.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA):

Releases of this material to air, land, or water are not reportable to the National Response Center under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or to state and local emergency planning committees under the Superfund Amendments and Reauthorization Act.

Superfund Amendments and Reauthorization Act of 1986 (SARA), Title III:

Section 302 extremely hazardous substances: None

Section 311/312 hazard categories: Delayed Health

Section 313 reportable ingredients at or above de minimus concentrations: None

California Proposition 65:

This product contains a chemical (crystalline silica) known to the State of California to cause cancer.

State Regulatory Lists:

Each state may promulgate standards more stringent than the federal government. This section cannot encompass an inclusive list or all state regulations. Therefore, the user should review the components listed in Section 2 and consult state or local authorities for specific regulations that apply.

16. Other information

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NO WARRANTY IS MADE, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE.

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06/01/2015

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Materials Company

Dear Customer/Contractor:

Please find attached a safety data sheet (SDS) for the product that you purchased from Vulcan Materials Company or one of its subsidiaries or affiliates ("Vulcan"). This is a revised SDS and replaces any previous versions of the material safety data sheet (MSDS) for this product. This SDS is provided to you as required by the Occupational Safety and Health Administration's (OSHA) Hazard Communication Standard (29 CFR 1910.1200), the Mine Safety and Health Administration's (MSHA) Hazard Communication Standard (30 CFR Part 47), and/or any applicable state Right-to-Know laws.

It is the responsibility of your company to communicate this information to your employees, customers, and contractors who may use or come in contact with this product. Further, if you distribute this product, Vulcan requests, and applicable laws may require, that you forward this SDS to your customers.

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Sincerely,

Occupational Health Office

Vulcan Materials Company

CAR WGT. 186,000 LBS to 260,000 LBS

LOCOMOTIVE AVG. 220 to 230 tons / 440,000 - 460,000 LBS.

Health Considerations for Workplace Exposure to Silica

(Adapted from *Special Emphasis Program for Silicosis*, U.S. Department of Labor, OSHA)

AVG CLASS I RAIL.

2 LOCOMOTIVES (MIN)

100 CARS

110 TRAINS PER DAY

@ 11,440 tons x 110 CRUSHING/MOVEMENT = FREE SILICA (22,880,000 LBS.) How much?

OSHA
DEPARTMENT OF LABOR & INDUSTRY

August 2012
Minnesota Department of Labor and Industry
Occupational Safety and Health Division

Background: Crystalline silica and silicosis

Crystalline silica is a ubiquitous substance that is the basic component of sand, quartz and granite rock (Markowitz & Rosner, 1995). Airborne crystalline silica occurs commonly in both work and nonwork environments. Occupational exposure to crystalline silica dust has long been known to produce silicosis, a pneumoconiosis or dust disease of the lung. Activities such as sandblasting, rock drilling, roof bolting, foundry work, stonecutting, drilling, quarrying, brick/block/concrete cutting, granite operations, lead-based paint encapsulant applications and tunneling through the earth's crust can create an airborne silica exposure hazard. In addition, some recently noted exposure to crystalline silica include the following.

- Calcined diatomaceous earth can contain anywhere from <1 percent to 75 percent cristobalite (a crystalline form of silica). In addition to use as a filtering media, calcined diatomaceous earth is often used in industries such as food and beverage preparation where only food grade products and equipment can come in contact with foods or beverages being made.

- Asphalt paving manufacturing may also be a source of crystalline silica exposure, due to the mechanical formation of crystalline silica dust when sand and aggregate passes through rotary dryers. The fine dust can have significant amounts of crystalline silica, depending upon the source of the aggregate. For example, rotary drying of gravel from the Willamette River in Oregon generated dust containing approximately 7 to 12 percent quartz. The waste dust was transferred periodically by front loader, resulting in clouds of visible dust drifting to the operator.

- The repair or replacement of linings of rotary kilns found in pulp and paper mills and in other manufacturing locations, as well as the linings in cupola furnaces, are potential sources of crystalline silica exposure. This work may not be commonly seen due to the infrequency and less visible nature of the work location. Turnarounds and yearly shutdowns are the time when this work commonly occurs.

- In food processing operations where crops such as potatoes and beans are readied for market, silica overexposures have been documented in the sorting, grading and washing areas.

Geologically, quartz is the second most common mineral in the earth's crust. Quartz is readily found in both sedimentary and igneous rocks. Quartz content can vary greatly among different rock types, for example: granite can contain from 10 to 40 percent quartz; shales have been found to average approximately 22 percent quartz; and sandstones can average almost 70 percent quartz.

Silica is a general term for the compound silicon dioxide (SiO_2). Silica can be crystalline or amorphous. Different crystalline silica structures exist as polymorphs of silica and include quartz and less common forms such as cristobalite and tridymite. The latter are less stable than quartz, which accounts for the dominance of the quartz form. Quartz can exist as two subpolymorphs, α-quartz or low quartz, and β-quartz or high quartz. Of these two forms, α-quartz is more common as the β-quartz is apparently only stable above temperatures of approximately 570°C. Upon cooling, β-

proper fit and that the elements of 29 CFR 1910.134 are being met.

- The worker should be referred to a physician specializing in lung diseases for a medical evaluation and medical monitoring as warranted by the examining physician. A written opinion from the examining physician about whether the employee has any detected condition that would place the worker at an increased risk should be provided to the employer and the employee, while specific medical findings remain confidential.

- All medical test results should be discussed with the worker by the physician.

- In accordance with 29 CFR 1910.1020, medical records shall be maintained for at least 30 years following the employee's termination of employment, unless the employee is employed for less than one year and the records are provided to the employee upon termination.

Engineering controls and other prevention techniques

Several techniques can be used to reduce employee exposure to crystalline silica. Not all can be used to abate every workplace exposure, but employers and employees should analyze each job to determine how exposure to silica can be kept as low as possible. Engineering controls and work practices that can be used to reduce workplace exposure include:

- exhaust ventilation and dust collection systems, including proper preventive maintenance;

- prevention of recirculation of dust in collectors;

- cleaning of work areas using vacuums with high-efficiency particulate air (HEPA) filters or wet-sweeping;

- proper hygiene, including wearing washable or disposable work clothes on the job and showering and changing into clean clothes at the end of the shift;

- water sprays for cleaning dust or when cutting concrete and masonry;

- use and proper maintenance of enclosed equipment cabs;

- material substitution in abrasive blasting operations;

- automatic blast cleaning machines and cabinets that allow operation from outside of the machine;

- wet drilling;

- use and proper maintenance of drill platform skirts with inside corner flaps;

- installation of air-ring seals where the drill pipe passes through the drill deck;

- raising the drill level in steps to minimize dust leakage and lowering the deck skirt after lifting; and

- use of water filters and needle valve controls for proper regulation of the water flow rate to the drill.

With the exception of sandblasting, respirators should only be used to lower employee exposures after all feasible engineering controls, administrative controls and work practices have been implemented.

During abrasive blasting operations, workers shall wear type CE abrasive blasting respirators operating in the positive-pressure mode.

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quartz quickly converts to α-quartz. In the literature, crystalline silica is commonly referred to as silica sand, free-silica, quartz, cristobalite and tridymite. When diatomaceous earth is subjected to pressure or is processed (calcined) at temperatures above 1,000°C, some of the amorphous silica is converted to crystalline silica in the form of cristobalite (Flynn, et al., 1991). Recent articles have documented the creation of cristobalite in "after-service" refractive ceramic fiber insulation (Ganter, 1986; Cheng et al., 1992; Bergen et al., 1994). Amorphous silica has been found to exist in nature as opal, flint, siliceous glass, diatomaceous earth and vitreous silica (Applied Occupational and Environmental Hygiene Journal, 1995).

Silicosis is one of the world's oldest known occupational diseases with reports dating back to ancient Greece. Since the 1800s, the silicotic health problems associated with crystalline silica dust exposure have been referred to under a variety of common names including: consumption, ganister disease, grinders' asthma, grinders' dust consumption, grinders' rot, grit consumption, masons' disease, miner's asthma, miner's phthisis, potters' rot, sewer disease, stonemason's disease, chalicosis and shistosis. Silicosis was considered the most serious occupational hazard during the 1930s and was the focus of major federal, state and professional attention during this time (Rosner & Markowitz, 1994). The hazard is still present more than 60 years later.

Crystalline silica is commonly found and used in the following industries:

- electronics;
- foundry;
- ceramics, clay, pottery, stone and glass;
- construction;
- agriculture;
- maritime;
- railroad (setting and laying track);
- slate and flint quarrying and flint crushing;
- use and manufacture of abrasives;
- manufacture of soaps and detergents; and
- mining.

Perhaps the most familiar use of quartz sand is as an abrasive blasting agent to remove surface coatings prior to repainting or treating. A recent alert published by the National Institute for Occupational Safety and Health (NIOSH) estimates there are more than one million American workers who are at risk of developing silicosis. Of these workers, 100,000 are employed as sandblasters (NIOSH, 1992).

In the United States, from 1968 through 1990, the total number of deaths where silicosis was reported anywhere on the death certificate was 13,744. Of these, 6,322 listed silicosis as the underlying cause of the death (Bang et al., 1995). In this study, deaths in the United States due to silicosis were primarily concentrated in 12 states (California, Colorado, Florida, Illinois, Michigan, New Jersey, New York, Ohio, Pennsylvania, Virginia, West Virginia and Wisconsin). The silica-related deaths in these 12 states accounted for 68 percent of the total silica-related deaths in the U.S. By industry, construction accounted for 10

percent of the total silicosis related deaths (Bang et al.).

Based upon the widespread occurrence and use of crystalline silica across the major industrial groups (maritime, agriculture, construction and general industry) and in consideration of the number of silicosis related deaths, the NIOSH estimates for the number of exposed workers and the health effects of crystalline silica dust exposure (e.g., pulmonary fibrosis, lung and stomach cancer), OSHA is implementing a nationwide special emphasis program to assure worker protection from overexposure to crystalline silica dust.

Health effects of silica exposure

Inhalation of crystalline silica-containing dusts has been associated with silicosis, chronic obstructive pulmonary disease, bronchitis, collagen vascular diseases, chronic granulomatous infections such as tuberculosis, and lung cancer. In general, aerosols of particulates can be deposited in the lungs. This can produce rapid or slow local tissue damage, eventual disease or physical plugging. Dust containing crystalline silica can cause formation of fibrosis (scar tissue) in the lungs (Markowitz & Rosner, 1995).

The inhalation of free crystalline silicon dioxide (SiO_2) can produce lung disease known as silicosis. Particle size, dust concentration and duration of dust exposure are important factors in determining the attack rate, latency period, incidence, rate of progression and outcome of disease. A higher attack rate and severity of silicosis is seen with heating crystalline silica-containing materials to greater than 800EC to transform SiO_2 into tridymite and cristobalite (both of which occur naturally and are also found in synthetic silica preparations). High cristobalite concentrations also result from direct conversion of diatomaceous earth following heat and/or pressure and can be found in the superficial layers of refractory brick that have been repeatedly subjected to contact with molten metal (Markowitz & Rosner, 1995).

NIOSH has classified three types of silicosis: acute, accelerated and chronic.

Acute health effects

Intense crystalline silica exposure has resulted in outbreaks of acute silicosis referred to medically as silico-proteinosis or alveolar lipoproteinosis-like silicosis. Initially, crystalline silica particles produce an alveolitis (inflammation of the gas exchange area of the lung) that is characterized by sustained increases in the total number of alveolar cells, including macrophages, lymphocytes and neutrophils. The alveolitis has been found to progress to the characteristic nodular fibrosis of simple silicosis.

A rapid increase in the rate of synthesis and deposition of lung collagen has also been seen with the inhalation of crystalline silica particles. The collagen formed is unique to silica-induced lung disease and biochemically different from normal lung collagen (Olishifski & Plog, 1988).

Accelerated health effects

Accelerated silicosis may occur with more intense exposure over five to 15 years. Fibrotic nodules are generally smaller and the massive fibrosis often occurs in the mid-zones in the lungs.

Acute and accelerated silicosis have been associated with abrasive blasters.

Chronic health effects

Chronic silicosis usually takes 20 to 45 years to develop as a result of prolonged exposure to free crystalline silica. Nodular lesions tend to form in the upper lobes. In the simple stage of silicosis, symptoms and impairment of pulmonary function are uncommon. If progressive massive fibrosis (PMF) forms from the coalescence of fibrotic nodules, the disease usually progresses, even following removal from exposure.

Symptoms of silicosis may not develop for many years. Shortness of breath with exertion is the most common symptom of established silicosis. Cough and expectoration may develop with disease progression, especially in cigarette smokers. Wheezing typically only occurs when conditions such as chronic obstructive bronchitis or asthma are also present. Significant abnormality on a chest X-ray may not be seen until 15 to 20 years of exposure have occurred.

When advanced disease and progressive massive fibrosis are present there is distortion of the normal architecture of the lung. Airway obstruction may occur from contraction of the upper lobes of the lung. Emphysematous changes may develop in the lower lobes of the lung (Schulter, 1994).

Cancer

The issue of crystalline silica exposure and cancer is a complicated one with disagreement in the literature (Lilis, 1992). In the worst case, exposure to respirable crystalline silica dust has been associated with lung cancer (Lilis, 1992; IARC, 1987; Checkoway et al., 1993; Goldsmith, 1994; Hnizdo & Sluis-Cremer, 1991; McLaughlin et al., 1992; Winter, et al. 1990). There also has been the suggestion of stomach cancer associated with ingestion of crystalline silica (Lippmann, 1995). The International Agency for Research on Cancer (IARC), in examining the carcinogenesis of crystalline silica, has published monographs regarding crystalline silica and some silicates. IARC determined there is sufficient evidence for carcinogenicity in experimental animals with limited evidence for carcinogenicity in humans and has classified silica as a 2B carcinogen (1987). IARC is in the process of revisiting the crystalline silica carcinogen issue based upon recent epidemiological studies.

Studies have demonstrated a statistically significant, dose-related increase in lung cancer in several occupationally exposed groups. Winter et al. (1990) observed the lung cancer risk for pottery workers increased with estimated cumulative exposure to low levels of silica found in potteries. Another study also found the risk of lung cancer among pottery workers was related to exposure to silica, although the dose-response gradient was not significant (McLaughlin et al., 1992). An adjustment for possibly confounding exposure to polycyclic aromatic hydrocarbons slightly raised the odds ratio for exposure to silica. This study also analyzed lung cancer risk in tin miners in China and found a significant trend of increasing lung cancer with increasing cumulative respirable silica exposure. A significant dose-response relationship between death from lung cancer and silica dust particle-years has also been demonstrated for South African gold miners (Hnizdo and Sluis-Cremer, 1991). In this study a synergistic effect on lung cancer risk was found for silica exposure and smoking. Lung cancer risk among workers in the diatomaceous earth industry has been studied by Checkoway et al. (1993). Results showed increasing risk gradients for lung cancer with cumulative exposure to

crystalline silica. The authors felt this finding indicated a causal relation. Several studies have demonstrated a relationship between the degree of silicosis disability and risk for lung cancer (Goldsmith, 1994). Since severity of silicosis reflects silica exposure, this may also indicate a dose-response relationship for silica exposure and lung cancer (Checkoway et al., 1993).

Note: Due to the potential association between exposure to dust containing crystalline silica and the development of lung and stomach cancer, one may find facilities where the employer is evaluating or has evaluated this exposure using thoracic samplers. Thoracic dust is defined as that portion in inhaled dust that penetrates the larynx and is available for deposition within the airways of the thorax. Thoracic dust includes the respirable fraction. The collection of thoracic dust samples is not a method used by OSHA.

Medical protocol recommendations for exposure to crystalline silica

Medical examinations

The following are the recommended medical procedures for individuals chronically exposed to crystalline silica or for individuals who have received one or more severe acute exposures to crystalline silica.

- A baseline examination that includes a medical and occupational history to elicit data about signs and symptoms of respiratory disease prior to exposure to crystalline silica. The medical examination emphasizing the respiratory system should be repeated every five years if less than 20 years of exposure and every two years if more than 20 years of exposure. The medical examination should be repeated more frequently if respiratory symptoms develop or upon the recommendation of the examining physician.

- A baseline chest X-ray should be obtained prior to employment, with a follow-up every five years if less than 20 years of exposure and every two years if more than 20 years of exposure. A chest X-ray may be required more frequently if determined by the examining physician.

- Pulmonary function tests (PFTs) should include forced expiratory volume in one second (FEV1), forced vital capacity (FVC) and diffusion lung capacity (DLC). PFTs should be obtained for a baseline examination with PFTs repeated every five years if less than 20 years of exposure and every two years if more than 20 years of exposure. PFTs may be required more frequently if respiratory symptoms develop or if recommended by the examining physician.

- A chest X-ray should be obtained upon employment termination.

Medical management

The chest X-ray should be a chest roentgenogram (posteroanterior 14" x 17" or 14" x 14") classified according to the 1970 ILO International Classification of Radiographs of Pneumoconiosis by a certified class "B" reader. The medical follow-up should include the following procedures.

- With a positive chest X-ray (1/0 or greater) the worker should be placed in mandatory respiratory protection or, if already wearing a respirator, the program should be re-evaluated to assure

DAILY OPERATION

F.R.A. limits rail car gross weight to 286,000 lbs. Empty rail cars weigh 66,000 lbs. Locomotives range in weight from 260,000 lbs for general purpose up to 460,000 or more for super duty locomotives. General purpose is a 4 axle locomotive, super duty is a 6 axle locomotive.

When trains go or pass over tracks, ties, ballast, the extreme pressures create up and down motion of road bed (rocks). This is a grinding action in road bed (rocks/stones) and makes free silica. This is why ballast needs to be replenished from time to time; it is one of the consumables in this process of transportation. The winds/air currents carry this silica (dust) to any one and anything within miles of the railroad, thus affecting what we breath – eat – drink.

Once again, this will be a recurring process because it will be reintroduced to the air as farmers farm, till and people drive down roads, cut their grass, children hike and play in parks and fields, people maintain their gardens and hang out their wash. This will lead to exposure over and over and over. Eventually enough of this silica will be in the ground where plants themselves will pass this on to those who consume the plants and aquatic life. This will affect the food chain from the beginning to us, the final consumers. Assuming that this product or material cannot be chemically broken down or digested, it will always be there thus creating fibrosis in the organs of whatever life forms passes through which will definitely be a life shortening hazard.

Vincent Kaznicki
340 S. 350 W.
Valpo. In. 46385

219-242-4751

Trainorders.com

Eastern Railroad Discussion > Freight car weights

Date: 11/23/10 17:15
Freight car weights
Author: OCtrainguy

My son is doing a school science project and we need some assistance in obtaining weights on freight cars such as a gondola, flat car and caboose. In using Google to search, I couldn't find what I was looking for, as we need the real deal cars, not model scales. I know there was a CNJ book about their freight cars as well as one from Conrail (I think). The local library wasn't very helpful, especially their website in searching for books. I've found a few websites that have photos with class and bearing information as well as load information, but not how much they weigh. Is there a website that would have this information, or would anyone know what a typical car would weigh?

[Reply To This Message] [Quote]

Date: 11/23/10 17:21
Re: Freight car weights
Author: toledopatch

The "LT WT" stencil on any freight car shows its weight the last time that was measured.

[Reply To This Message] [Quote]

Date: 11/23/10 17:31
Re: Freight car weights
Author: NSDTK

Most cars are 33 tons empty. Tanks are always heavyer couse they leave a little of the load in the car when they unload them.

See this web site aswell. http://worldtraderef.com/WTR_site/Rail_Cars/Guide_to_Rail_Cars.asp

Edited 1 time(s). Last edit at 11/23/10 17:34 by NSDTK.

[Reply To This Message] [Quote]

Date: 11/23/10 20:44
Re: Freight car weights

Author: wa4umr

Watch out. Some of this is in metric, some in the good old American system.

[Reply To This Message] [Quote]

Date: 11/24/10 02:41
Re: Freight car weights
Author: Jimmie

LT WT (Light Weight) is the weight of the empty car given in pounds if the car belongs to a US railroad. Mexican-owned cars usually have the weight in kilograms (2.2 kg = 1 pound).

LD LMT (Load Limit) is the weight of the load given in pounds. The total of the light weight and load limit will be a maximum of 186,000 pounds for a four-axle freight car in accordance with FRA regulations.

Check out these two Yahoo Groups:
Railroad Freight Cars: http://groups.yahoo.com/group/RailroadFreightCars/
Intermodal Railroad: http://finance.groups.yahoo.com/group/IntermodalRailroad/

Most of the pictures I post to those groups have the weights given in the picture description.

Jimmie Fisher
Alexander, NC
Flickr

[Reply To This Message] [Quote]

Date: 11/24/10 04:41
Re: Freight car weights
Author: toledopatch

Jimmie Wrote:

> LD LMT (Load Limit) is the weight of the load
> given in pounds. The total of the light weight
> and load limit will be a maximum of 186,000 pounds
> for a four-axle freight car in accordance with FRA
> regulations.

Make that 286,000 pounds.

[Reply To This Message] [Quote]

Date: 11/24/10 08:04
Re: Freight car weights
Author: Bandito

OCtrainguy Wrote:

> ...Is there a website that
> would have this information...

Try the websites for car lessors such as GATX, GE Rail, etc.; car manufactuers such as Trinity and Gunderson; TTX; and Class I's.

[Reply To This Message] [Quote]

Date: 11/24/10 10:11
Re: Freight car weights
Author: scraphauler

Here are the AVERAGE actual tare weights for cars that operate in fleet I manage

52 ft mill gon with 5ft sides, 263,000 gross rated - 64300
52 ft mill gon with 5 1/2 ft sides, 286,000 gross rated - 66500
66 ft mill gon with 5 1/2 ft sides, 286,000 gross rated - 76500
4000 cubic foot, high side, flat bottom gon, 263,000 rated (ex steel coal gon) - 60,700
4240 cubic foot, high side, single tub (depressed), 263,000 rated (ex steel coal bath tub) - 55300
73 ft unequipped bulk head flat, 263,000 gross rated - 80600
73 ft bulk head flat equipped with 4 pipe/log bunks, 263,000 gross rated - 90400
70 ft unequipped bulk head flat, 286,000 gross rated - 83000

[Reply To This Message] [Quote]

Date: 11/24/10 11:17
Re: Freight car weights
Author: OCtrainguy

Thanks to all for the information. I'll check out my photos, to see if I have any clear ones with the weight numbers and check out some of the websites. I've also gotten some information from a friend of mine, so I should be able to put it all together for my son.

[Reply To This Message] [Quote]

Date: 11/24/10 13:57
Re: Freight car weights
Author: Jimmie

Fingers, brain (or what's left), and eyes just don't want to co-operate at 5:00 in the morning. I should have caught that.

toledopatch Wrote:

> Jimmie Wrote:
> ---
> -----
> > LD LMT (Load Limit) is the weight of the load
> > given in pounds. The total of the light weight
> > and load limit will be a maximum of 186,000
> pounds
> > for a four-axle freight car in accordance with
> FRA
> > regulations.
>
> Make that 286,000 pounds.

Jimmie Fisher
Alexander, NC
Flickr

[Reply To This Message] [Quote]

Date: 11/24/10 21:21
Re: Freight car weights
Author: SOO6617

Jimmie Wrote:

> LT WT (Light Weight) is the weight of the empty
> car given in pounds if the car belongs to a US
> railroad. Mexican-owned cars usually have the
> weight in kilograms (2.2 kg = 1 pound).

You have this one reversed 1 kg = 2.2 lbs

[Reply To This Message] [Quote]

Date: 11/25/10 02:12
Re: Freight car weights
Author: Jimmie

That's it!!!! I ain't posting any thing else before noon!!!!

SOO6617 Wrote:

> Jimmie Wrote:
> ---
> -----

> > LT WT (Light Weight) is the weight of the empty
> > car given in pounds if the car belongs to a US
> > railroad. Mexican-owned cars usually have the
> > weight in kilograms (2.2 kg = 1 pound).
>
> You have this one reversed 1 kg = 2.2 lbs

Jimmie Fisher
Alexander, NC
Flickr

[Reply To This Message] [Quote]

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DIESEL FUEL / EXHAUST

Diesel fuel is composed of many hazardous/harmful chemicals (see attachments) which when combusted the chemicals produced will cause life changes in humans, animals, birds and aquatic life. This is because these chemicals wind up in the air which in some way or shape every living thing uses.

People exposed to these hazards by living near operations which use diesel fuel have a 26% higher mortality rate than people not exposed to the same concentrations. It is a given that all air around the globe has minute amounts of diesel exhaust and jet fuel exhaust but people living in hot spots are at a significantly higher health risk. These are FACTS that have been proven through studies over the last 70 to 100 years (see attachments).

All studies of human workers and those exposed (people living near source) have shown various kinds of mutagenic activity and culture systems which means that their DNA and chromosomes have been altered. Children are most susceptible, next come the elderly. The overall conclusions of any study that has been performed all agree that exposure to diesel exhaust significantly increases human health risks.

My family has one member on oxygen 24/7 and a ventilator to assist in breathing 70% of the time. Two members of my household have severe asthma. I myself am sensitive to diesel exhaust which means I have a hard time breathing and after being exposed for a short period of time I have extreme headaches and feel sick. My sensitivity is a result of my working with and around diesels as a mechanic for 20+ years. I am a former employee of General Motors Electromotive Diesel Division. My responsibilities were to perform warranty and repairs on locomotives under service contract to the Santa Fe and Burlington Northern Railroads.

DIESEL EXHAUST EMISSIONS

The information that I will give next comes from the EPA Emissions Standards for Diesel Locomotives. There are multiple tiers ranging from 0 to 4. These classify locomotives by age and efficiency as far as their emissions. I could use the standards from Tiers 0 through Tier 3 since the majority of locomotives in the United States fall into that class. But I have chosen to use the most modern information and state-of-the-art equipment as a standard in imparting this information. Keep in mind Tier 0 can emit 8 to 40 times as much hazardous pollution at Tier 4 depending on which category we look at.

Vincent Kuznicki
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Emissions categories are:

	Tier 4 Specifications Grams Per Gallon of Fuel
Particulate Matter	PM = 3.1
Hydrocarbons	HC = 5.1
Volatile Organic Chemicals	VOC = 5.37
Oxides of Nitrogen	NOx = 121
Sulfur Dioxide	SO2 = 1.88

On a super duty locomotive fuel consumption rate at full throttle is 165 gallons per hour. That equals 2.75 gallons per mile. Class 1 railroads run a minimum of 2 locomotives per train. Depending on weight of freight, number of locomotives could be 4 or 5 but we will consider 2 for our purposes. Two locomotives would therefore consume 5.5 gallons per mile. Considering the fact that this rail system will have 110 trains per day or the possibility thereof, we would have to do the math and conclude that we would be burning 605 gallons per mile per day.

Now after doing the math we have more realistic numbers that people can understand by using a lbs. standard.

PM = 4.10
HC = 6.88
VOC = 7.24
NOx = 163
SO2 = 2.53

These numbers are what the emissions will be per mile per day at a total of 183.75 lbs. per mile per day.

Considering there will be at least a 20 mile run through Porter County, we will multiply the above number by 20 which means we now have 3,675 lbs. of hazardous emissions per day in Porter County alone. Keep in mind my estimates are of perfect mechanical conditions, best possible off road diesel fuel and an underestimate of miles of distance.

Any switching locomotives or yard equipment such as mobile cranes for intermodal container movements in service/maintenance or intermodal yards are not known. Idle times (running but not moving) is also unknown. Switching locomotive standards are supplied but fuel consumption rates are hard to factor without knowing how many and what type of equipment will be used.

Intermodal yards (will come after rail construction permits are given) will have many semi trucks, which the numbers are also unknown and fall under different emission specs of on road fuel.

So total emissions and pollution load on environment is impossible to quantify at this time.
We will not know until its too late to change or prevent!

Exhausted by Diesel

How America's Dependence on Diesel Engines Threatens Our Health

Top of Report

Chapter 2
HUMAN HEALTH IMPACTS

The scientific evidence is clear: diesel exhaust is a complex mixture comprised of hazardous particles an carcinogens and others probable carcinogens. Diesel exposure poses a significant and avoidable increas evidence from dozens of well-designed studies supports the conclusion that diesel exhaust causes cance exhaust aggravate respiratory illnesses such as bronchitis, emphysema and asthma and are associated w disorders.[9] The evidence of health effects is derived from extensive studies of human workers as well as of various kinds of mutagenic activity in culture systems. Based on extensive evidence, 41 constituents o State of California as Toxic Air Contaminants, as shown in Table 1. The only reasonable conclusion one evidence is that exposure to diesel exhaust significantly increases human health risks.

Table 1: Substances in Diesel Exhaust Listed by Cal EPA as Toxic Air

acetaldehyde	inorganic lead
acrolein	manganese compounds
aniline	mercury compounds
antimony compounds	methanol
arsenic	methyl ethyl ketone
benzene	naphthalene
beryllium compounds	nickel
biphenyl	4-nitrobiphenyl
bis[2-ethylhexyl]phthalate	phenol
1,3-butadiene	phosphorus
cadmium	polycyclic organic matter, inc

chlorine	polycyclic aromatic hydrocarl (PAHs)
chlorobenzene	and their derivatives
chromium compounds	propionaldehyde
cobalt compounds	selenium compounds
creosol isomers	styrene
cyanide compounds	toluene
dibutylphthalate	xylene isomers and mixtures
dioxins and dibenzofurans	o-xylenes
ethyl benzene	m-xylenes
formaldehyde	p-xylenes

Note: California Health and Safety Code section 39655 defines a "toxic air contaminant" as "an air pol which may cause or contribute to an increase in mortality or in serious illness, or which may pose a p potential hazard to human health."

Diesel Exhaust and Cancer: Beyond a Reasonable Doubt

Many studies have shown that diesel exhaust causes mutations in chromosomes and damage to DNA, pr in the causation of cancer.[10] There is also overwhelming evidence from studies of workers occupationally increased cancer risk. Most of the over two dozen well-designed worker studies found lung cancer increas over a decade.[46] Similar increases in risk are found in studies that controlled for cigarette smoking, as in f unavailable. A recent analysis shows that consistent findings of an approximately 30 percent increase in ri workers is highly unlikely to be due to chance, confounders (such as smoking), or bias.[47] Unfortunately, m estimates of exposure levels, particularly for occupational exposures that occurred in the past.* The task c further complicated by the fact that there is no standard methodology for measurement of exposure, and or components of diesel exhaust may be most significant in inducing disease.

Despite these difficulties, the occupational studies consistently demonstrate that exposure to diesel exhau increase the human incidence of lung cancer, and possibly of bladder cancers. U.S. EPA, Cal EPA, the Na Health, and the International Agency for Research on Cancer have all consistently agreed on the relations lung cancer.[48] Numerous independent analyses of the data by top scientists have come to the same conc

Many animal studies also indicate that inhalation of diesel exhaust causes cancer.[50] The studies primarily noted increased tumors at other sites.[51] However, the relevance of these studies has been questioned sir diesel exhaust levels and the resulting inflammation and cell proliferation does not appear to occur at occu

Quantifying the Cancer Risk from Diesel Exhaust

Despite the extensive scientific data available, there is still uncertainty concerning exactly how potent a ca Ph.D., a nationally recognized expert on diesel exhaust from Clark University, performed an independent a analysis, that sought to characterize the current uncertainty and estimate the diesel cancer risk.[52] Among a microgram per cubic meter (µg/m³) of diesel exhaust, Dr. Hattis's estimated 90 percent confidence range expected to develop lung cancer. The average estimate is 230 per million so exposed.[53]

Unfortunately, most people are exposed to more than 1 µg/m³ of diesel exhaust every day. In fact, the Ca the average total exposure for Californians who spend most of their time indoors is 1.54 µg/m³ of diesel e concentration of diesel exhaust in California in 1995 is 2.2 µg/m³. These estimates were arrived at by ave Estimates of diesel exhaust exposure levels in urban areas range as high as 23 µg/m³. Chronic exposure many more lung cancer cases. We expect exposure levels in rural and urban areas throughout the country

The U.S. EPA suggests that a cancer risk may be "negligible" if a substance induces one excess cancer c lifetime. Using the mean value in Dr. Hattis's uncertainty distribution for diesel exhaust potency, the expec of diesel exhaust found in California-of 1.54 µ/m³ of diesel exhaust-is likely to result in an excess risk over per million exposed.[55] This risk is far above U.S. EPA's "negligible risk" level. Applying these risk estimate exhaust may cause 12,000 *or more* additional cancer cases in California alone.[56] The potential health risk

Moreover, these risk estimates are for the "average" person who breathes less than the statewide outdoo exhaust. People who are exposed to higher than average levels of diesel exhaust, such as urban residents centers and other diesel "hot spots," and occupationally exposed individuals, would have higher risks of lu indicate the magnitude of the task before us in reducing the diesel risk and only hint at the enormous huma cancer has a poor prognosis; the five-year survival rate is less than 14 percent.[57] Thus if 350 excess lung exposed, 300 of these victims would likely die within five years.

Beyond Cancer: Other Health Impacts from Diesel Exhaust

Airborne particulate matter smaller than 10 microns in size, also called PM_{10}, are respirable particles, mea our lungs. Even smaller particles, smaller than 2.5 microns in size ($PM_{2.5}$), are even more likely to lodge a More than 98 percent of the total number of particles in diesel exhaust are $PM_{2.5}$.[31] PM_{10} has been regulat and by U.S. EPA since 1987. However, efforts to control PM_{10} alone will not suffice to reduce diesel exha measures of PM_{10} are mass-based, control strategies emphasize reductions of larger, heavier particles, s construction and agriculture, and are unlikely to focus on reducing the $PM_{2.5}$ from diesel combustion. Rec particles, U.S. EPA adopted new National Ambient Air Quality Standards for particles under 2.5 microns i 16, 1997.[58]

Lung Damage

Great advances have been made in the 1990s in understanding the health effects of fine particles. Since health studies have linked respirable particle concentrations below the level of the current air quality stand increased hospital and emergency room admissions. Long-term exposure has been related to decreases adults.[60] Recurrent respiratory illnesses in children are associated with increased particulate exposures, a a risk factor for later susceptibility to lung damage.[61]

Particulate matter exposure causes changes in lung function and inflammation of the small airways.[62] Furt cause constriction of the bronchi and impair clearance processes which normally remove particles and inf consequences may include aggravation of existing respiratory problems, more frequent or severe damag

Infections and Asthma

Particulate exposure may increase susceptibility to bacterial or viral respiratory infections, and may incre vulnerable members of the population, including the elderly, people with chronic pulmonary diseases, and the presence of pre-existing heart or lung disease, respiratory exacerbations induced by air pollutants ma

Recent research indicates that diesel exhaust may increase the frequency and severity of asthma exacer airways that can cause or worsen asthma.[65] This information is quite new and extremely important in light

the rise, increasing nearly 40 percent among U.S. children between 1981 and 1988.[66] There are an estima with asthma.[67] The death rate from asthma has increased by 118 percent from 1980 to 1993.[68] Asthma o American and Latino children;[69] indeed, African-American children are four times more likely to die from a Latino mothers have a rate of asthma two-and-a-half times higher than whites and more than one-and-a-h

Premature Death

In December 1993, Harvard researchers published the results of a sixteen-year-long community health stu six U.S. cities with differing levels of air pollution. After adjusting for age and smoking, researchers found 26 percent higher mortality rate than those living in the least polluted city.[71] This translated into a one- to tw most polluted cities.[72] Another major study corroborated these findings. The study correlated American C million adults with air pollution data in 151 U.S. metropolitan areas. The study found that people living in th greater risk of mortality than people living in the least polluted city.[73]

A number of prestigious international panels, including a British Committee on the Medical Effects of Air I Council of the Netherlands, have concluded that there is a cause-and-effect relationship between particula conclusion is warranted based on the consistency of the association in different studies and situations, th biological plausibility.

In 1996, U.S. EPA published a risk assessment focusing on Southeast Los Angeles County. The U.S. EP annually due to levels of particle pollution above the current federal standards in this particular area of Los estimated more than 52,000 episodes of respiratory symptoms each year-including about 1,000 hospital in 1995 in Southeast Los Angeles. U.S. EPA estimates more than 40,000 particle-related health effects (in Los Angeles even if the area brought pollution down to the current federal particle standards.

NRDC performed a study entitled *Breath Taking: Premature Mortality Due to Particulate Air Pollution in 2* the risk relationships identified in the American Cancer Society and Harvard studies. In this study, release risk relationships to a variety of urban areas where particle levels had been adequately monitored. We fou deaths per year may be attributable to the existing levels of particles in the air.

Other Non-Cancer Impacts

Many of the individual constituents of diesel exhaust are known to produce harmful effects. Benzene, for e blood and the blood-forming tissues.[76] Formaldehyde and acetaldehyde can cause irritation of the eyes, r and mercury are known to cause birth defects and other reproductive problems.[78] Dioxins are toxic to the function, and are toxic to reproduction.[79] These non-cancer effects of diesel exhaust components can als which these effects may occur from current exposure levels is unclear.

Focus #2: The "Great" Diesel Invention

In 1892, Rudolf Diesel invented the diesel "compression ignition" engine. A diesel engine operat the cylinder and compressing it to a point where the temperature is high enough to ignite the fuel plug. This type of compression ignition system produces a significant amount of power and is fu

The use of diesel engines spread throughout the United States and Europe after 1900, ultimatel engines. Diesel engines operate on fairly inexpensive fuel oils and can withstand heavy loads at Conventional gasoline engines were unable to perform as well under heavy load conditions and to the heavy weight of the early engines, diesel was used almost exclusively for heavy-duty pow

transportation and to a limited extent in industrial establishments.

The market for diesels broadened due to technological advances in the late 1930s that raised th the engine weight, allowing the use of diesel engines for on-road applications. General Motors d engine that was suitable for railroad use, and was later adapted to drive trucks and buses. This v on diesel for movement of freight and passengers, which has lasted through this century.

Notes

* This limitation often means that the studies may underestimate human risk, as when studies desig exposure at all to a category of "exposed" workers, despite the fact that many had exposures little i whose workplace involves no exposure to diesel.

9. Shprentz D, "Breathtaking: Premature Mortality Due to Particulate Air Pollution in 239 American (pp. 13-32.

10. Mauderly JL. Diesel Exhaust in Lippman M. (ed.) Environmental Toxicants: human exposures ar Reinhold, New York, 1992

31. Bagley, Susan T., et al. 1996. Characterization of Fuel and Aftertreatment Device Effects of Die Number 76. *Health Effects Institute,* Topsfield, Massachussetts. September.

46. See eg. Garshick et al. A Case-Control Study of Lung Cancer and Diesel Exhaust Exposure in I 135:1242-1248, 1987; Garshick et al. A Retrospective Cohort Study of Lung Cancer and Diesel Ex Am Rev Resp Dis 137:820-825, 1988; Swanson GM et al. Diversity in the Association Between Oc Black and White Men. Canc Epi Biomark Prev 2:313-320, 1993; Steenland K et al. Exposure to Die and Possible Relationships with Lung Cancer. Am J Ind Med 21:887-890, 1992

47. Bhatia R, Lopipero P, Smith AH, Diesel Exhaust Exposure and Lung Cancer. Epidemiology, 9:8

48. Dawson, et. al., Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant, Part B: I Exhaust. Public and Scientific Review Panel Review Draft [hereinafter referred to as OEHHA, 199E February 1998, pp. 1-8 - 1-9.

49. Steenland K, Lung Cancer and Diesel Exhaust: a Review. Am J Ind Med, 10:177-189, 1986; Bh Exhaust Exposure and Lung Cancer. Epidemiology, 9:84-91, 1998; Pepelko and Peirano, 1983, He Engine Emissions, J. Amer. Coll. Toxicol. 2: 253-306.

50. The National Institute for Occupational Safety and Health (NIOSH) states, "Exposure to diesel (benign and malignant tumors in rats and mice. Therefore, NIOSH recommends that whole diesel ex occupational carcinogen in conformance with the OSHA Cancer Policy (29 CFR 1990)." NIOSH Cu "Carcinogenic Effects of Exposure to Diesel Exhaust," U.S. Department of Health and Human Ser

51. Brightwell et al., 1986, Neoplastic and Functional Changes in Rodents After Chronic Inhalation (Ishinishi et al., eds., Carcinogenic and Mutagenic Effects of Diesel Engine Exhaust, Elsevier: Amst 1989, Tumors of the Respiratory Tract in Rats and Hamsters Following Chronic Inhalations of Engi Toxicol. 9: 23-31; Ishinishi et al., 1986, Long-term Inhalation Studies on Effects of Exhaust from He F344 Rats, in Ishinishi et al., eds., Carcinogenicity and Mutagencity of Diesel Engine Exhaust, Else

52. Cal EPA calculated a draft risk range in their report. According to their calculation, the unit risk r to 1.5 per 1000 (with exposure at 1 mg/m3). This means that if a million people are exposed chroni particulate per cubic meter (mg/m3), between 130 and 1500 individuals may get lung cancer from th

Health Risk Assessment, February 1998, p. 1-17.

53. Hattis D, A Probability-Tree Interpretation of the California EPA's Analysis of the Cancer Risk f the ARB on March 19, 1998.

54. This number is a third lower than the estimated 1990 average ambient diesel exposure level of : Average ambient level in California are anticipated by ARB to decline to 1.8 microgram per cubic m ARB, Draft Diesel Executive Summary, February 1998, p. ES-12.

55. This excess risk estimate is obtained by multiplying the 1.54 micrograms per cubic meter expos risk estimate derived by Dr. Hattis.

56. The 12,000 cancer case estimate is derived by multiplying the excess cancer risk estimate of 3: by California's population of 34 million people. Using Cal EPA's draft risk range, the calculation wou 51,000 lung cancers in California. Calculated using OEHHA, 1998 Diesel Health Risk Assessment, al. (ed.) SEER Cancer Statistics Review, 1973-1994, National Cancer Institute, NIH Publication Nu p. 288.

57. Ries LAG, et al. (ed.) SEER Cancer Statistics Review, 1973-1994, National Cancer Institute, N Bethesda, MD, 1997. p. 288.

58. U.S. EPA, National Ambient Air Quality Standards for Particulate Matter; Final Rule, Federal Re Number 138) p. 38651-38701.

59. Brunekreef B, Air pollution from truck traffic and lung function in children living near motorways.,

60. Ackermann-Liebrich U, Lung function and long term exposure to air pollutants in Switzerland: St Diseases in Adults (SAPALDIA) Team., Am J Respir Crit Care Med;155(1):122-129, 1997

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Technical Highlights

Emission Factors for Locomotives

The Environmental Protection Agency (EPA) has established emission standards for oxides of nitrogen (NOx), hydrocarbons (HC), carbon monoxide (CO), particulate matter (PM) and smoke for newly manufactured and remanufactured locomotives. These standards, which are codified at 40 CFR part 1033, include several sets of emission standards with applicability dependent on the date a locomotive is first manufactured. The first set of standards (Tier 0) applies to most locomotives originally manufactured before 2001. The most stringent set of standards (Tier 4) applies to locomotives originally manufactured in 2015 and later. This fact sheet describes EPA's estimates of the typical in-use emission rates for locomotives subject to these standards, as well as the previous standards.

It is important to emphasize that this fact sheet relies on many simplifying assumptions. Thus emission rates calculated as described in this fact sheet should be considered as approximations.

Estimated Locomotive Emission Rates by Tier

EPA has estimated average emission rates, given in grams per brake horsepower-hour (g/bhp-hr), for uncontrolled locomotives and those required to meet the various emission standards. Emissions were estimated for two different types of operation: a low power cycle representing operation in a switch yard, and a higher power cycle representative of general line-haul operation. These estimates are shown in Tables 1 and 2. Note that plus signs in the table indicate that a given tier of standards was revised in a 2008 rulemaking (73 FR 37096, June 30, 2008). For example, locomotives originally manufactured in years 2002-2004 were initially subject to the original Tier 1 standards, but will be required to meet revised Tier 1 standards (also known as Tier 1+ standards) when remanufactured. See the regulatory text for a more precise explanation of which standards apply to which locomotives.

EPA United States Environmental Protection Agency

Office of Transportation and Air Quality
EPA-420-F-09-025
April 2009

It is important to note that there can be significant variability in in-use emission rates, especially for uncontrolled locomotives. Also, a single locomotive's emission rate can vary throughout its life as the engine ages and as ambient conditions change. Thus the values presented here are intended to reflect the average emission rates. It is also worth noting that these emission estimates were developed in the context of adopting new emission standards. This is especially important for the CO emission factors. Because EPA's CO emission standards were intended to cap CO emissions at pre-control levels (which were relatively low), we have not projected any reductions in CO emission factors. However, recent testing indicates that emission controls designed to reduce PM and HC emissions are also reducing CO emissions. Thus the CO emission rates presented here may be too high and should be used with some caution. A similar effect may also apply for HC emissions from Tier 0 and Tier 1 locomotives (but not the Tier 0+ and Tier 1+ locomotives).

Table 1 - Line-Haul Emission Factors (g/bhp-hr)

	PM_{10}	HC	NO_x	CO
UNCONTROLLED	0.32	0.48	13.00	1.28
TIER 0	0.32	0.48	8.60	1.28
TIER 0+	0.20	0.30	7.20	1.28
TIER 1	0.32	0.47	6.70	1.28
TIER 1+	0.20	0.29	6.70	1.28
TIER2	0.18	0.26	4.95	1.28
TIER 2+ & TIER 3	0.08	0.13	4.95	1.28
TIER 4	0.015	0.04	1.00	1.28
+ INDICATES THAT THESE ARE THE REVISED STANDARDS IN 40 CFR PART 1033				

Table 2 - Switch Emission Factors (g/bhp-hr)

	PM_{10}	HC	NO_x	CO
UNCONTROLLED	0.44	1.01	17.40	1.83
TIER 0	0.44	1.01	12.60	1.83
TIER 0+	0.23	0.57	10.60	1.83
TIER 1	0.43	1.01	9.90	1.83
TIER 1+	0.23	0.57	9.90	1.83
TIER2	0.19	0.51	7.30	1.83
TIER 2+	0.11	0.26	7.30	1.83
TIER 3	0.08	0.26	4.50	1.83
TIER 4	0.015	0.08	1.00	1.83
+ INDICATES THAT THESE ARE THE REVISED STANDARDS IN 40 CFR PART 1033				

Conversion to Gram per Gallon Emission Factors

It is often useful to express emission rates as grams of pollutant emitted per gallon of fuel consumed (g/gal). This can be done by multiplying the emission rates in Table 1 or 2 by a conversion factor relating the fuel consumption (gal/hr) and the usable power (bhp) of the engine. EPA has estimated different conversion factors for different types of locomotive service as shown in Table 3. The two primary reasons for the differences are variations in locomotive age and duty cycle. Fuel efficiency tends to be worse for older locomotive designs and for locomotives used in low power applications such as switching. Note that the g/gal emission factors presented at the end of this fact sheet can be converted back to g/bhp-hr by dividing them by the conversion factors shown here.

Table 3
Conversion Factors (bhp-hr/gal)

Locomotive Application	Conversion Factor (bhp-hr/gal)
Large Line-Haul and Passenger	20.8
Small Line-Haul	18.2
Switching	15.2

Conversion to Gram per Ton-Mile Emission Factors

In some cases, it can be helpful to express emission factors as grams emitted per ton-mile of freight hauled. However, this can also be very problematic because the amount of engine work required for each ton-mile varies significantly with a variety of factors. For example, it takes more work to haul freight through mountainous terrain than across flat areas. Since EPA does not have detailed information about these variations, we cannot provide accurate g/ton-mile emission rates. However, very approximate national average values can be calculated based on data collected by the Association of American Railroads for revenue ton-miles and fuel consumption, which show that about one gallon of fuel is consumed by the railroads to haul 400 tons-miles of freight. Thus dividing g/gal emission rates by 400 ton-miles/gal gives approximate g/ton-mile emission rates.

Emission Inventory Estimation

Total emissions can be calculated by multiplying the emission factors (in g/gal) by the fuel consumption rates (in million-gal/yr) to give annual emission rates (in metric tons per year). Multiplying this metric estimate by 1.102 gives standard U.S. tons (or short tons) per year.

EPA has estimated that locomotives consume approximately 4 billion gallons of diesel fuel each year. This includes national/regional freight service, switching, local freight service, and passenger service. The relative amounts of fuel used in the United States for these four different types of operation are shown in Table 4. The great majority of fuel consumed by locomotives each year is used in line-haul freight service by the largest railroads. Smaller amounts are also used in

switching and passenger service, and by very small railroads. For the purpose of this fact sheet, we are aggregating the largest railroads with smaller railroads that are fully subject to EPA's emission requirements. This includes regional railroads as well as other railroads such as those that are owned by large businesses. The local freight category includes only those railroads that meet our regulatory definition of "small railroad" (40 CFR 1033.901) to qualify for small business allowances under our regulations. These railroads are included in this fact sheet as local whether or not they are truly local in nature. The passenger category includes local commuter railroads and AMTRAK.

Table 4 - Locomotive Fuel Consumption by Service Category	
National and Regional Freight Line-haul	88%
National Freight Switching	7%
Local Freight	<2%
Passenger	3%

Other Pollutants

The preceding emission factors include those pollutants for which EPA has set emission standards. However, other pollutants may also be of interest.

The broad category of volatile organic compounds (VOC) is a slightly different way of aggregating the organic pollutants controlled by our HC emission standards. In our rulemaking analysis (http://www.epa.gov/otaq/regs/nonroad/420r08001a.pdf), we estimated that VOC emissions can be assumed to be equal to 1.053 times the HC emissions. Similarly, PM emissions can be expressed as PM_{10} (which includes all particles up to 10 microns in diameter) or $PM_{2.5}$ (which includes only those particles up to 2.5 microns in diameter). $PM_{2.5}$ emissions can be estimated as 0.97 times the PM_{10} emissions, meaning that nearly all of the PM is less than 2.5 microns in diameter.

Gram per gallon emissions of sulfur dioxide (SO_2) and carbon dioxide (CO_2) are largely independent of engine parameters and are primarily dependent on fuel properties. Locomotive-specific emission rates are not presented here. Instead, SO_2 and CO_2 emission rates should be calculated based on the properties of the specific fuel being used by the locomotives. These emission rates can also be assumed to be the same as for other diesel engines operating on similar fuel. Note that special caution should be used when estimating SO_2 emission rates since the sulfur content of diesel fuel varies much more than the carbon content. Also, while the vast majority of sulfur in the fuel is typically converted to SO_2, up to 5 percent of the sulfur is oxidized further to sulfate (and forms particulate matter), so that the fraction of fuel sulfur emitted as SO_2 may be as low as 95 percent. Examples of these calculations are shown below based on inputs described in the NONROAD technical document NR-009c (http://www.epa.gov/otaq/models/nonrdmdl/nonrdmdl2004/420p04009.pdf).

SO_2 (g/gal) = (fuel density) × (conversion factor) × (64 g SO_2/32 g S) × (S content of fuel)

Consider the example where the density of diesel fuel is 3200 g/gal, the fraction of fuel sulfur converted to SO_2 is 97.8 percent, and the sulfur content of the fuel is 300 ppm.

SO_2 (g/gal) = (3200) × (0.978) × (2.00) × (300×10^{-6}) = 1.88 g/gal

CO_2 (g/gal) = (fuel density) × (44 g CO_2/12 g C) × (C content of fuel)

Consider the example where the density of diesel fuel is 3200 g/gal and the carbon content of the fuel is 87 percent by mass.

CO_2 (g/gal) = (3200) × (3.67) × (0.87) = 10,217 g/gal

Other trace pollutants such as N_2O, methane, and many air toxics are more dependent on engine parameters. At this time, however, EPA does not have detailed emission rates for these pollutants from locomotives. Where estimates are needed for N_2O or methane, you may assume that emissions of these pollutants from locomotives are similar to those of other diesel engines with similar technology. For N_2O, you may assume the emissions are proportional to total NOx. For methane, you may assume the emissions are proportional to total hydrocarbons. Note however, that the presence of catalyzed components in the exhaust can significantly affect these ratios. So it is best to compare emissions from uncatalyzed locomotives to emissions from other uncatalyzed diesel engines. While this same approach could be used for air toxics (assuming that air toxic emissions are proportional to total hydrocarbons), EPA has estimated air toxic emissions from locomotives. These estimates are described in the National Emission Inventory documentation (see ftp://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002nei_mobile_nonroad_methods.pdf - appendix C).

Projected Future Emission Factors

Tables 5-7 give the expected fleet average NOx, PM_{10}, and HC emission factors by calendar year for the four categories of locomotives (the same four categories as are shown in Table 4). The steady decline in these emission factors reflects the penetration of the various tiers of locomotives into the fleet over time. More detail regarding the assumptions on which these projections were based can be found in the Regulatory Impact Analysis for the 2008 rulemaking (http://www.epa.gov/otaq/regs/nonroad/420r08001a.pdf)

Technical Highlights

SULFUR 1.88 x 605 = 1,137.4 grms.

A DAY
2.53 LBS
PER MILE

For More Information

You can access the rule and related documents on EPA's Office of Transportation and Air Quality (OTAQ) Web site at: www.epa.gov/otaq/locomotives.htm.

For more information on this rule, please contact the Assessment and Standards Division information line at:

U.S. Environmental Protection Agency
Office of Transportation and Air Quality
2000 Traverwood Drive
Ann Arbor, MI 48105
Voicemail: (734) 214-4636
E-mail: asdinfo@epa.gov

Table 5 – NOx Emission Factors (g/gal)

Calendar Year	Large Line-haul	Large Switch	Small Railroads	Passenger/Commuter	Overall Average
2006	180	250	242	244	188
2007	175	249	242	229	183
2008	169	243	242	214	177
2009	165	241	242	200	172
2010	157	236	242	183	165
2011	149	235	242	167	157
2012	144	227	242	157	152
2013	139	225	242	147	147
2014	135	217	242	138	143
2015	129	215	240	131	137
2016	121	208	239	119	129
2017	114	206	237	112	122
2018	108	202	236	105	117
2019	103	200	233	98	112
2020	99	187	231	93	107
2021	94	185	228	88	102
2022	89	177	225	83	97
2023	84	172	223	78	92
2024	79	162	220	73	87
2025	74	150	217	68	81
2026	69	144	215	64	77
2027	65	138	212	60	72
2028	61	132	209	56	68
2029	57	126	206	52	64
2030	53	119	203	49	60
2031	49	112	200	46	56
2032	46	105	197	42	52
2033	43	98	193	39	49
2034	40	91	190	36	46
2035	37	84	187	33	43
2036	35	77	184	30	40
2037	33	71	180	28	38
2038	31	67	177	26	36
2039	29	63	174	24	34
2040	28	60	171	23	32

163 LBS A MILE A DAY

Table 6 – PM_{10} Emission Factors (g/gal)

Calendar Year	Large Line-haul	Large Switch	Small Railroads	Passenger/Commuter	Overall Average
2006	6.4	6.5	6.5	6.5	6.4
2007	6.3	6.5	6.5	6.4	6.3
2008	5.1	5.5	5.7	5.1	5.1
2009	4.9	5.5	5.7	5.0	4.9
2010	4.7	5.4	5.7	4.8	4.7
2011	4.4	5.3	5.7	4.5	4.5
2012	4.1	5.1	5.7	4.2	4.2
2013	3.8	5.0	5.6	3.9	3.9
2014	3.6	4.8	5.6	3.6	3.7
2015	3.4	4.8	5.5	3.4	3.5
2016	3.1	4.6	5.5	3.1	3.3
2017	2.9	4.5	5.4	2.8	3.0
2018	2.7	4.4	5.4	2.6	2.8
2019	2.5	4.4	5.4	2.3	2.6
2020	2.3	4.1	5.3	2.1	2.5
2021	2.2	4.0	5.3	2.0	2.4
2022	2.0	3.9	5.3	1.8	2.2
2023	1.9	3.7	5.2	1.7	2.1
2024	1.7	3.5	5.2	1.5	1.9
2025	1.6	3.2	5.1	1.4	1.8
2026	1.5	3.1	5.1	1.2	1.6
2027	1.4	3.0	5.1	1.1	1.5
2028	1.3	2.8	5.0	1.0	1.4
2029	1.1	2.7	5.0	0.9	1.3
2030	1.0	2.5	4.9	0.8	1.2
2031	1.0	2.4	4.8	0.7	1.1
2032	0.9	2.2	4.8	0.7	1.0
2033	0.8	2.1	4.7	0.6	0.9
2034	0.7	1.9	4.6	0.6	0.9
2035	0.7	1.7	4.6	0.5	0.8
2036	0.6	1.6	4.5	0.5	0.7
2037	0.6	1.5	4.4	0.4	0.7
2038	0.5	1.4	4.4	0.4	0.6
2039	0.5	1.3	4.3	0.4	0.6
2040	0.4	1.2	4.2	0.3	0.5

Technical Highlights

4.1 LBS PER MILE PER DAY

Table 7 - HC Emission Factors (g/gal)

Calendar Year	Large Line-haul	Large Switch	Small Railroads	Passenger/Commuter	Overall Average
2006	9.5	15.0	11.7	9.7	10.0
2007	9.3	15.0	11.7	9.5	9.8
2008	9.0	14.5	11.7	9.3	9.5
2009	8.7	14.5	11.7	9.1	9.1
2010	8.3	14.1	11.7	8.6	8.8
2011	7.7	14.0	11.7	8.1	8.2
2012	7.1	13.3	11.7	7.5	7.6
2013	6.5	13.3	11.7	6.9	7.1
2014	6.1	12.7	11.7	6.3	6.7
2015	5.7	12.6	11.7	5.8	6.3
2016	5.1	12.0	11.7	5.2	5.7
2017	4.6	11.8	11.7	4.6	5.2
2018	4.2	11.5	11.7	4.1	4.8
2019	3.9	11.4	11.7	3.5	4.5
2020	3.6	10.5	11.7	3.1	4.2
2021	3.4	10.4	11.7	2.9	4.0
2022	3.2	9.8	11.7	2.7	3.8
2023	3.0	9.5	11.7	2.4	3.6
2024	2.8	8.9	11.7	2.2	3.4
2025	2.6	8.0	11.7	2.0	3.1
2026	2.5	7.6	11.7	1.8	2.9
2027	2.3	7.3	11.7	1.6	2.8
2028	2.1	6.9	11.7	1.5	2.6
2029	2.0	6.5	11.7	1.3	2.4
2030	1.9	6.2	11.7	1.2	2.3
2031	1.7	5.8	11.7	1.1	2.2
2032	1.6	5.5	11.7	1.0	2.0
2033	1.5	5.1	11.7	0.9	1.9
2034	1.4	4.7	11.7	0.8	1.8
2035	1.3	4.4	11.7	0.7	1.7
2036	1.2	4.0	11.7	0.7	1.6
2037	1.2	3.7	11.7	0.6	1.5
2038	1.1	3.6	11.7	0.6	1.4
2039	1.1	3.4	11.7	0.5	1.4
2040	1.0	3.2	11.7	0.5	1.3

6.88 Per Mile Per Day

Wgt. / Fuel

Class I Railroad Statistics (continued)

Association of American Railroads — January 20, 2016

	2013	2014	2015p
Traffic			
Carloads Originated (million, from FCS)	28.83	30.22	n.a.
Intermodal Units (million):			
Containers	11.35	11.97	12.23
Trailers	1.48	1.53	1.48
Total (see notes)	12.83	13.50	13.71
Tons Originated (billion)	1.758	1.840	n.a.
Ton-miles (revenue ton-miles in trillions)	1.741	1.851	n.a.
Operating Statistics			
Freight Revenue Per Ton-Mile	4.051¢	4.054¢	n.a.
Average Tons Per Carload	61.0	60.9	n.a.
Average Tons Per Train	3,488	3,606	n.a.
Average Length of Haul (miles)	990.5	1006.0	n.a.
Financial			
Freight Revenue (billion)	$70.5	$75.1	n.a.
Operating Revenue (billion)	$72.9	$77.7	n.a.
Operating Expense (billion)	$51.6	$54.1	n.a.
Net Income (billion)	$13.4	$14.4	n.a.
Operating Ratio	70.8%	69.7%	n.a.
Return on Average Equity	14.19%	13.38%	n.a.
Return on Year-End Assets	6.98%	6.86%	n.a.

n.a. - not yet available

Notes

Miles of Road is the aggregate length of roadway, excluding yard tracks and sidings, and does not reflect the fact that a mile of road may include two, three, or more parallel tracks. Miles of road operated figures will be higher than mileage owned since more than one railroad can operate the same roadway by having trackage rights. Figures on page 1 include mileage owned by U.S. railroads in Canada. Excluding double-counting for trackage rights, Class I railroads operated in 2012 a total of 95,264 miles of the 138,524 mile network in the United States.

Freight Cars in Service includes any owner in North America. Because Canadian railroads have significant operations in the USA, and non-railroads own a significant number of freight cars, freight car counts herein are for Canada, Mexico, and the U.S. – for all owners.

Carloads, as reported here and in *Freight Commodity Statistics,* include intermodal traffic and will differ from the AAR's *Weekly Railroad Traffic* which segregates intermodal traffic from carloads and does not include Canadian-owned railroads in the U.S. railroad totals. These figures also will not match carloads from the Carload Waybill Sample, which is an estimate (based on a sample) for all railroads in the United States.

Intermodal on this page includes one former Class I railroad and excludes two Canadian-owned Class I railroads. The Class I portion is a subset of other traffic figures herein.

39 Ton Per Axle

U.S.A. 93 Ton Per Car 186,000 LBS.

Answers Home

All Categories
Arts & Humanities
Beauty & Style
Business & Finance
Cars & Transportation
Computers & Internet
Consumer Electronics
Dining Out
Education & Reference
Entertainment & Music
Environment
Family & Relationships
Food & Drink
Games & Recreation
Health
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Cars & Transportation Rail

How long is a typical freight t

a diesel electric 2 locomotive freight train, how man
load, assuming they are just cargo type cars. how r
chemical cars? how many steel scrap cars?

Update: how many of each type, assuming it is haul
time.

Follow 5 answers

Answers

Best Answer: There really is no set answer to
powered according to the weight they will pull not the amount of cars they
have.A train might be 60 auto racks and only need t
covered hoppers and need four units to pull it.It dep
train is also.A higher priority train will get more pow
so it can make better speed.Trains are getting long
home tonight that was a manifest(mixed freight) tha
tons and 8,613 feet long powered by 4 units.It was
on the point and 1 pusher at the rear.I would say a
these days is between 6,000 to 8,000 feet.

Source(s):
UPRR engineer

Andy · 6 years ago

4 0

Asker's rating ★★★★★

There are an awful lot of variables in your question
swer, quite a few.

It depends on a lot of things, such as grade, how st
in question, how many horsepower in the locomotiv
tives vary greatly in power.

But your question says typical, in the area where I v
class locomotive with an avearage 4000 HP would l
to 6000 tons, max.
Loaded freight cars are designed to weigh close to the same when loaded

Related Questions

Gone like a freight train yesterday long gone gone long gone im long gone lyrics for this song?

Are you gonna take a freight train down at the station?

Train vs Cyclist!! who wins?

More questions

Answer Questions

How often does the 3801 steam locomotive operate and is thus annually or many times per year, depending on running costs and other things?

Which locomotive is more powerful Pennsylvania railroafd Q2 or the southern pacific cabforwards?

How to reach delhi sarai rohilla railway station to koushambi metro station?

What type brake is used in ac traction in Indian railways?(Mumbai rail)?

125 to 145 tons, makes no difference if it is fuel, coal, barley or scrap iron. So, doing the math 2 locomotives can pull a 10,000 ton train, you could have roughly70 to 80 loaded cars in that train.

Many freight trains are mixed freight and will have quite a few empty cars in there, those average about 35 tons each so a train with 50 loads and 50 empties could haul a lot more cars, keeping within the same tonnage limits of the locomotives.

Source(s):
RR engineer

Rango · 6 years ago

2 0 Comment

In the US a train could be half a mile long or more. The cars are typically 50-60 feet long, so take half a mile and divide by say 60 feet and there's your answer - 44.

It could be a bulk train consisting of one type of car only, or a mixed train with several types.

squeaky guinea pig · 6 years ago

0 0 Comment

Lets take a typical unit cola train. It consists of 150 cars, each car is 55 feet long, and it is pulled/pushed by three 65 foot long locomotives. The cars are 8250 ft, the locomotives add 195 feet, for a total of 8445 ft (2572m) long.

Length of train is determined by several things including: weight if ladings/cars combined, where cars are "way-billed" to, terrain, motive power (locomotives) restraints, track infrastructure (passing siding lengths.

Source(s):
model railroading, railfaning, RR employees

dc911ds19 · 6 years ago

1 0 Comment

i just heard on my scanner a coal train with 105 where i live.

Source(s):
scanner

Anthony · 6 years ago

0 0 Comment

How long is a typical freight train?

Add your answer

People also ask

How long is the average freight train?

How long is a train allowed to block a crossing?

How long is the longest train in the world?

How long does it take for a train to stop going 50 mph?

A 150-car freight train traveling 50 miles per hour takes 8000 ft. (or 1.5 miles) to stop. An 8-car passenger train traveling 79 miles per hour takes 6000 ft. (or **1 1**/8 miles) to stop.

Railroad Crossing Safety Index & Overview - Safe New York
www.safeny.ny.gov/rail-ndx.htm

Search for: How long does it take for a train to stop going 50 mph?

How long can trains go? - National Post
www.nationalpost.com/long+trains/4348592/story.html ▾ National Post

Feb 26, 2011 - Up until the 1990s, the average freight train in Canada was **about 5,000 feet (1.54 kilometres)** long and weighed 7,000 tons. But it is now not uncommon to see these trains stretch to 12,000 feet, sometimes as much as 14,000 feet (more than four kilometres), weighing up to 18,000 tons.

Is Bigger Better? 'Monster' Trains vs Freight Trains
www.popularmechanics.com/technology/infrastructure/a5314/4345689/ ▾

Feb 10, 2010 - Monster **Train LENGTH** U.S. **average**: 6500 feet and climbing. 18,061 feet--but there's no legal limit on freight **train length** in the U.S.. LOAD

What is the typical length of a freight train - Answers
www.answers.com › ... › Categories › Travel & Places › Train Travel ▾

A **typical** CSX double-stack container **train** carries 280 containers. Each railcar is 80 feet chafing plate to chafing plate.

What are the dimensions of a standard railway car?
www.funtrivia.com/askft/Question91211.html ▾ FunTrivia

Jan 16, 2008 - What are the dimensions of a standard **railway** car - trivia question /questions ... Even with an overall increase in **length**, the R44's only had eight sets of ... http://www.csx.com/?fuseaction=customers.search_car&n=**Typical%** ...

Images for typical length of a train

Report images

So it would be safe to say that trains are much more efficient than standard road vehicles. That being so, then hard steel wheels on cars, with vastly improved suspensions, would work better than standard vehicles. The problem then becomes one of CONTROL, because the reduction of surface connecting the car with the road means a necessary loss of braking and steering power, resulting in a very hazardous situation. But for semis, this would be much more feasible, and technically possible. Smaller tracks designed specifically for semis might be very possible, and the monetary savings would be fantastic. The available routes would be limited, (between major metropolitan areas), and such a diesel electric truck transportation system would be almost totally automated.

? · 2 years ago

0 0 Comment

Contrary to popular beliefs, CC does not always give the best mileage. I works good on flat prairie, but uses more gas in hilly terrain by acceleration up hill to keep up the speed. Turn it off in the hills and keep a steady gas pedal and let the car slow down going up and it will regain the speed on the other side. try these methods of improving gas mileage. Only use 20% or 1/4 of your gas peddle, that's all you really need. For best mileage, drive with traffic, keep up with the slow lane and don't cause a blockage. you'll get good mileage following traffic, you let off the gas alot. The biggest thing you can do is your driving style, you get twice the mileage slowing down and triple going down hill, so the sooner you let off the gas the better you will do. anticipate stop signs and lights, left off the gas as soon as you can.. Always use your od, if you don't have one, put on 2 size larger tires on the drive wheels and remember to figure a correction for mileage. you can check it against a gps to find it.. it really helps if you have a car with a mileage computer so you can watch it...

Elizabeth · 2 weeks ago

0 0 Comment

165 GAL. PER HR FOR 2 LOCOS.
@ 60 MI. PER HR =
TIMES 110 TRAINS =

165 x 2 ÷ 60 x 110 = 605

605 GAL. PER MILE

Samurai HogheadWell, they don't figure using "MPG", but rather Ton/Miles Per Gallon.

At full rack (aka "run 8" or "wide open") the newer, more fuel efficient locomotives are consuming around 165 gallons per hour. A significant improvement over the old SD45s and their 196 gallon per hour thirst. That is per locomotive, so, if you have four newer locos in the consist, multiply 165 by 4, and you are consuming 660 gal/hr. At $2.75 per gal for fuel, the consist is drinking $1850 worth of diesel every hour.

But, if pulling an average 10,000 ton train, in terms of cost of fuel, you're only spending 18 and 1/2 cents per ton per mile to move it. That's pretty good mileage, yes?

But, unless climbing a grade, you are only in run 8 until you get the train up to maximum authorized speed, then throttle back to maintain that speed, making throttle adjustments as necessary.

Once you're at that point is where the significant TMPG goes way up. As a current NS commercial says, move one ton 420 miles on one gallon of fuel.

VINCENT KUZNICKI
340 S. 350 W.
VALPO. IN. 46385
(219) 242-4751

HEALTH HAZARDS

Carcinogens and Mutagens:
In diesel fuels there are 40 substances that the EPA lists as hazardous air pollutants, 15 of them are carcinogens or mutagens. We know carcinogens cause cancer and we also know mutagens disrupt and alter DNA and chromosomes. Railroads use off road fuel which is 10x higher in sulfur than on road fuel (see attachment).

Hydrocarbons combined with oxides of nitrogen in the presence of sunlight creates ground level ozone. Sulfur dioxide ends of causing acid rain. Considering the fact that this fuel has 10x the sulfur as road fuel, we can be assured there will be 10x as much acid rain as found near highways where on road fuels are used.

Particulate matter is exactly what it means, particles in the air which everything that uses air will breathe in and these particles will be trapped in the airways and lungs.

Volatile organic chemicals are even more dangerous. They affect our nervous system, our organs and in some cases our reproductive cycles. Effects will also be seen in livestock, plants, birds and aquatic life. V.O.C. & NO_x COMBINED IN THE PRESENCE OF SUN LIGHT CREATES GROUND LEVEL OZONE, SMOG.

Coolant Additives (Borate nitrate or sodium borate): Systems hold 260 to 500 or more gallons of coolant.
Railroads tell their people these chemicals are not harmful and can be poured on the ground. Not so according to the EPA and MSD sheets. There are only three approved ways to dispose of the coolants:

1. Dump into municipal sewer systems and let the city deal with.
2. Dump into storage tanks to be handled as chemical waste.
3. Dump on ground, waterways, ditches and wetlands by permit only (and yes they will have permits). Because there is a coolant release valve to protect the $1 million dollar engine from freeze damage in the event that the locomotive experiences a failure and shuts off. This is another reason why you see multiple locomotives on Class 1 railways, because in the event one locomotive fails the train cannot be left stranded on the track, the next train would rear end it. This auto valve I spoke of automatically dumps the coolant at 50 degree F. Borate nitrate does and will contaminate farmlands, water supplies and wells for drinking and irrigation. This will damage wetlands, farmlands, drainage channels, lakes and streams. Dry borate nitrate on dry grass can be ignited by friction.

PubMed

Abstract

J Air Waste Manag Assoc. 2001 Jun;51(6):809-47.

Diesel engines: environmental impact and control.

Lloyd AC[1], Cackette TA.

Author information

Abstract

The diesel engine is the most efficient prime mover commonly available today. Diesel engines move a large portion of the world's goods, power much of the world's equipment, and generate electricity more economically than any other device in their size range. But the diesel is one of the largest contributors to environmental pollution problems worldwide, and will remain so, with large increases expected in vehicle population and vehicle miles traveled (VMT) causing ever-increasing global emissions. Diesel emissions contribute to the development of cancer; cardiovascular and respiratory health effects; pollution of air, water, and soil; soiling; reductions in visibility; and global climate change. Where instituted, control programs have been effective in reducing diesel fleet emissions. Fuel changes, such as reduced sulfur and aromatics content, have resulted in immediate improvements across the entire diesel on- and off-road fleet, and promise more improvements with future control. In the United States, for example, 49-state (non-California) off-road diesel fuel sulfur content is 10 times higher than that of national on-road diesel fuel. Significantly reducing this sulfur content would reduce secondary particulate matter (PM) formation and allow the use of control technologies that have proven effective in the on-road arena. The use of essentially zero-sulfur fuels, such as natural gas, in heavy-duty applications is also expected to continue. Technology changes, such as engine modifications, exhaust gas recirculation, and catalytic aftertreatment, take longer to fully implement, due to slow fleet turnover. However, they eventually result in significant emission reductions and will be continued on an ever-widening basis in the United States and worldwide. New technologies, such as hybrids and fuel cells, show significant promise in reducing emissions from sources currently dominated by diesel use. Lastly, the turnover of trucks and especially off-road equipment is slow; pollution control agencies need to address existing emissions with in-use programs, such as exhaust trap retrofits and smoke inspections. Such a program is underway in California. These and other steps that can be continued and improved will allow the use of the diesel engine, with its superior fuel consumption, to continue to benefit society while greatly reducing its negative environmental and health impacts. The next ten years can and must become the "Decade of Clean Diesel."

Comment in

Diesel engines: environmental impact and control--a critical review introduction. [J Air Waste Manag Assoc. 2001]

PMID: 11417675 [PubMed - indexed for MEDLINE]

ENVIRONMENTAL Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

ARD-44 2014

Diesel Vehicles and Equipment: Environmental and Public Health Impacts

What are Diesel Emissions?

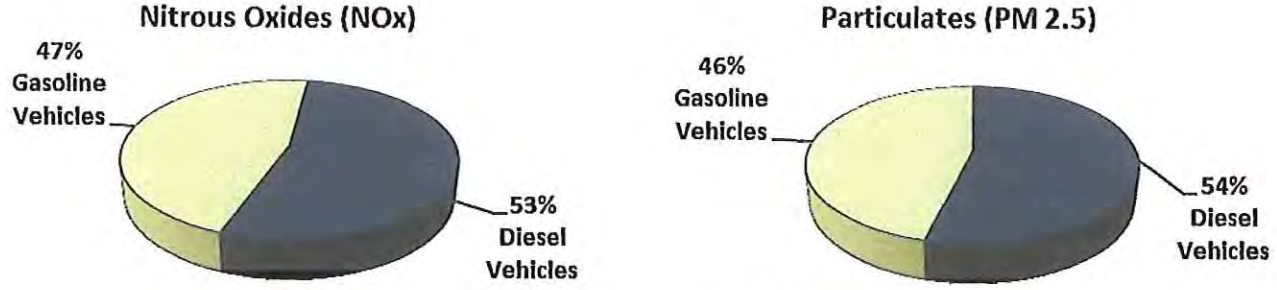
Diesel vehicles and equipment impact public health and the environment because of their exhaust, a highly complex mixture of over 40 gases and fine particles. Primary pollutants emitted from diesel engines include:

- Particulate emissions (PM)
- Carbon monoxide (CO)
- Carbon dioxide (CO_2)
- Nitrogen oxides (NOx)
- Volatile Organic Compounds (VOCs)
- Other chemicals classified as "Hazardous Air Pollutants: (HAPs)

Environmentally, diesel emissions contribute to a number of air pollution problems including climate change, acid rain and ground level ozone (smog). In 2012, the International Agency for Research on Cancer (IARC), part of the World Health Organization (WHO), revised the classification of diesel engine exhaust to Group 1 (definite) carcinogen for humans, based on sufficient evidence that exposure is associated with an increased risk for lung cancer. Previously, the IARC classified diesel emissions as a Group 2A "probable" carcinogen.

Although they make up less than 5% of all vehicles on the road, the table below shows diesel vehicles contribute more than half the nitrous oxide and particulate emissions from on-road vehicles. This is partly because emission standards for diesel vehicles have lagged behind those for gasoline standards. While more stringent federal emission controls for heavy duty diesel fueled vehicles that took effect in 2007 sharply curtailed the pollution caused by this fleet, the longevity of diesel vehicles in general means that many older, dirtier diesel vehicles continue to operate on our highways.

Comparison of Nitrous Oxides and Small Particulates Emissions from Gasoline and Diesel Vehicles



Source: U.S. EPA National Emissions Inventory Database

Environmental and Health Effects

The impacts of diesel exhaust remain a concern both here in New Hampshire and regionally. Diesel emissions adversely affect the environment by interfering with climate, the physiology of plants, animal species and entire ecosystems, as well as human property in the form of agricultural crops and man-made structures. We list climate as the most important environmental component due to the fact that global climate change has been recognized as one of the most important environmental problems of the 21st century. From a public health point of view, diesel emissions can aggravate or lead to heart and lung disease, cancer, asthma and other health problems.

Different diesel emission components adversely affect the environment and public health in different ways:

- Particulates impair visibility, adversely affect plant growth and damage soil structure and property. Black carbon particulates absorb energy, leading to atmospheric warming. Short term exposure aggravates heart and lung problems while long-term exposure can lead to the development of heart and lung diseases.

- Nitrous oxides are the primary pollutants that create low level ozone (smog), acid rain and nitrate particulates. Nitrous oxides also aggravate heart and lung problems and increase the susceptibility to respiratory infection.

- Carbon monoxide impairs the body's ability to transport oxygen throughout the body. It contributes to carbon dioxide, one of the greenhouse gases leading to climate change.

- Volatile Organic Compounds and nitrous oxides are the two leading pollutants that result in ozone formation. VOCs and hazardous air pollutants (HAPS) are associated with cancer as well as neurological, reproductive and respiratory health problems.

- Ozone is not directly produced by diesel engines but is formed by NOx and VOCs emissions combining in the atmosphere in the presence of sunlight. Ozone is a greenhouse gas, it slows plant growth by reducing photosynthesis and it directly damages plant cells. Ground level ozone decreases lung function, aggravates asthma and causes inflammation of lung tissues along with other respiratory problems.

An additional area of concern for the Department of Environmental Services (NHDES) is exposure to diesel exhaust by children travelling to and from school on buses. In a Yale University study, children were found to be exposed to school bus diesel particulates in concentrations sometimes five to fifteen times higher than background particulates levels.[1] NHDES has programs that encourage schools to reduce bus idling. Additionally, state law requires schools to develop policies that minimize vehicular emissions around schools.[2]

Another health problem associated with diesel exhaust is its disproportionate impact on low income urban neighborhoods where vehicle emissions are concentrated. Advocates for environmental justice cite proximity to traffic congestion and transportation hubs as the cause. Occupational exposure may also present an increased risk of related health problems to truck drivers, railroad workers and equipment operators.

For more information on diesel vehicles and equipment, please see the NHDES website at http://des.nh.gov/organization/divisions/air/tsb/tps/msp/diesel-vehicles/index.htm or contact NHDES' Mobile Sources Section at (603) 271-4848.

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[1] "Children's Exposure to Diesel Exhaust on School Buses, Environment & Human Health, Inc., http://www.ehhi.org/reports.diesel/

[2] New Hampshire RSA 200:48 Air Quality in Schools

Health Effects of Diesel Emissions

Diesel exhaust contains several pollutants that contribute to the formation of ground level ozone, acid rain, and are harmful to public health alone or in combination with other substances.

Diesel emissions also increase pollutant levels including ozone and fine particles. Harmful ozone comes primarily from vehicle exhaust, gasoline vapors, and industrial emissions. Fine particles come from a variety of natural and industrial sources, including the sources of harmful ozone levels. Diesel emissions directly release fine particles into the air and on hot days, diesel exhaust from on-road vehicles and off- road equipment increases the level of ground ozone. These high levels of ozone and fine particles are detrimental to public health and the environment.

What are the effects?

The health effects of diesel exhaust are both acute, from short-term exposure, and chronic, from long-term or repeated exposure. Specific health risks and their severity depend upon the amount of chemical exposed to as well as the duration of the exposure. An acute exposure to diesel exhaust could cause an irritation of the eyes, nose, throat, and lungs as well as lightheadedness. Chronic exposure to diesel exhaust can have several more severe effects on human health. Chronic exposure is likely to occur when a person works in a field where diesel is used regularly or experiences repeated exposure to diesel fumes over a long period of time. Human health studies demonstrate a correlation between exposure to diesel exhaust and increased lung cancer rates in occupational settings. Experimental animal inhalation studies of chronic exposure to diesel exhaust have shown that a range of doses cause varying levels of inflammation and cellular changes in the lungs. Human and laboratory studies have also provided considerable evidence that diesel exhaust is a likely carcinogen.

Who is at risk?

Individuals may react differently to the same type of exposure. The more sensitive portion of the population is likely to have a stronger reaction than the average healthy person. Children, the elderly, and people with cardiovascular or lung disease, such as emphysema and asthma tend to be more vulnerable to exposure.

Diesel Exhaust Pollutants

Some of the pollutants found in diesel exhaust are listed below:

Carbon Dioxide

Carbon dioxide is formed as a by-product of fuel combustion and is toxic in higher concentrations.

Carbon Monoxide

Carbon monoxide is formed by incomplete fuel combustion. Carbon monoxide reduces the flow of oxygen in the bloodstream and is of particular concern to people with cardiovascular disease.

Fine Particulate Matter (PM 2.5)

PM 2.5 is a mixture of solid particles and liquid droplets in the air. Because of its small size, fine particulate matter can be deposited deep in the lungs where it can cause health problems. Recent studies have shown an association between particulate matter and premature mortality from respiratory and cardiovascular disease and increased incidence of respiratory illness particularly in children and the elderly. For adults with heart or lung conditions, exposure to fine particulate matter can cause more illness and in some cases premature death. More than 90 percent of the particulates found in diesel exhaust are fine particles.

Hazardous Air Pollutants

Diesel exhaust contains 40 substances that the U.S. Environmental Protection Agency (U.S. EPA) lists as hazardous air pollutants. Fifteen of these pollutants are considered probable or known human carcinogens.

Hydrocarbons

Hydrocarbons are formed by incomplete fuel combustion. When combined with nitrogen oxides in the presence of sunlight, hydrocarbons produce ground-level ozone, which can irritate the eyes, damage lungs, and aggravate respiratory problems. Symptoms include coughing, shortness of breath, and decreased lung function. Many hydrocarbons are also considered hazardous air pollutants.

Nitrogen Oxides

Nitrogen oxides are by-products of fuel combustion and contribute to the formation of ground-level ozone. Health effects include coughing, shortness of breath, and decreased lung function.

Additional Resources

- American Lung Association: Health Air
- U.S. EPA: Health Assessment Document for Diesel Exhaust Emissions
- U.S. EPA: Mobile Source Air Toxics

How can you minimize your risk?

If you have a diesel vehicle, avoid idling. Turn your engine off when you are stopped.

Keep your diesel vehicle well tuned and maintained.

When purchasing a diesel vehicle, purchase one that meets or exceeds U.S. EPA's new emissions standards ahead of schedule.

Mutagen

From Wikipedia, the free encyclopedia

In genetics, a **mutagen** is a physical or chemical agent that changes the genetic material, usually DNA, of an organism and thus increases the frequency of mutations above the natural background level. As many mutations can cause cancer, mutagens are therefore also likely to be carcinogens, although not always necessarily so. Not all mutations are caused by mutagens: so-called "spontaneous mutations" occur due to spontaneous hydrolysis, errors in DNA replication, repair and recombination.

The international pictogram for chemicals that are sensitising, mutagenic, carcinogenic or toxic to reproduction.

Contents

Discovery of mutagens

The first mutagens to be identified were carcinogens, substances that were shown to be linked to cancer. Tumors were described more than 2,000 years before the discovery of chromosomes and DNA; in 500 B.C., the Greek physician Hippocrates named tumors resembling a crab *karkinos* (from which the word "cancer" is derived via Latin), meaning crab.[1] In 1567, Swiss physician Paracelsus suggested that an unidentified substance in mined ore (identified as radon gas in modern times) caused a wasting disease in miners,[2] and in England, in 1761, John Hill made the first direct link of cancer to chemical substances by noting that excessive use of snuff may cause nasal cancer.[3] In 1775, Sir Percivall Pott wrote a paper on the high incidence of scrotal cancer in chimney sweeps, and suggested chimney soot as the cause of scrotal cancer.[4] In 1915, Yamagawa and Ichikawa showed that repeated application of coal tar to rabbit's ears produced malignant cancer.[5] Subsequently in the 1930s the carcinogen component in coal tar was identified as a polyaromatic hydrocarbon (PAH), benzo[a]pyrene.[2][6] Polyaromatic hydrocarbons are also present in soot, which was suggested to be a causative agent of cancer over 150 years earlier.

The mutagenic property of mutagens was first demonstrated in 1927, when Hermann Muller discovered that x-rays can cause genetic mutations in fruit flies, producing phenotypic mutants as well as observable changes to the chromosomes,[7] visible due to presence of enlarged 'polytene' chromosomes in fruit fly salivary glands.[8] His collaborator Edgar Altenburg also demonstrated the mutational effect of UV radiation in 1928.[9] Muller went on to use x-rays to create Drosophila mutants that he used in his studies of genetics.[10] He also found that X-rays not only mutate genes in fruit flies but also have effects on the genetic makeup of humans.[11] Similar work by Lewis Stadler also showed the mutational effect of X-ray on barley in 1928,[12] and ultraviolet (UV) radiation on maize in 1936.[13] The effect of sunlight had previously been noted in the nineteenth century where rural outdoor workers and sailors were found to be more prone to skin cancer.[14]

Chemical mutagens were not demonstrated to cause mutation until the 1940s, when Charlotte Auerbach and J. M. Robson found that mustard gas can cause mutations in fruit flies.[15] A large number of chemical mutagens have since been identified, especially after the development of the Ames test in the 1970s by Bruce Ames that screens for mutagens and allows for preliminary identification of carcinogens.[16][17] Early studies by Ames showed around 90% of known carcinogens can be identified in Ames test as mutagenic (later studies however gave lower figures),[18][19][20] and ~80% of the mutagens identified through Ames test may also be carcinogens.[20][21] Mutagens are not necessarily carcinogens, and vice versa. Sodium azide for example may be mutagenic (and highly toxic), but it has not been shown to be carcinogenic.[22]

Effects of mutagens

Mutagens cause changes to the DNA that can affect the transcription and replication of the DNA, which in severe cases can lead to cell death. The mutagen produces mutations in the DNA, and deleterious mutation can result in aberrant, impaired or loss of function for a particular gene, and accumulation of mutations may lead to cancer. Mutagens may therefore be also carcinogens. However, some mutagens exert their mutagenic effect through their metabolites, and therefore whether such mutagens actually become carcinogenic may be dependent on the metabolic processes of an organisms, and a compound shown to be mutagenic in one organism may not necessarily be carcinogenic in another.[23]

Different mutagens act on the DNA differently. Powerful mutagens may result in chromosomal instability,[24] causing chromosomal breakages and rearrangement of the chromosomes such as translocation, deletion, and inversion. Such mutagens are called clastogens.

Mutagens may also modify the DNA sequence; the changes in nucleic acid sequences by mutations include substitution of nucleotide base-pairs and insertions and deletions of one or more nucleotides in DNA sequences. Although some of these mutations are lethal or cause serious disease, many have minor effects as they do not result in residue changes that have significant effect on the structure and function of the proteins. Many mutations are silent mutations, causing no visible effects at all, either because they occur in non-coding or non-functional sequences, or they do not change the amino-acid sequence due to the redundancy of codons.

Some mutagens can cause aneuploidy and change the number of chromosomes in the cell.

In Ames test, where the varying concentrations of the chemical are used in the test, the dose response curve obtained is nearly always linear, suggesting that there is no threshold for mutagenesis. Similar results are also obtained in studies with radiations, indicating that there may be no safe threshold for mutagens. However, some proposed that low level of some mutagens may stimulate the DNA repair processes and therefore may not necessarily be harmful.

Types of mutagens

Mutagens may be of physical, chemical or biological origin. They may act directly on the DNA, causing direct damage to the DNA, and most often result in replication error. Some however may act on the replication mechanism and chromosomal partition. Many mutagens are not mutagenic by themselves, but can form mutagenic metabolites through cellular processes, for example through the activity of the cytochrome P450 system and other oxygenases such as

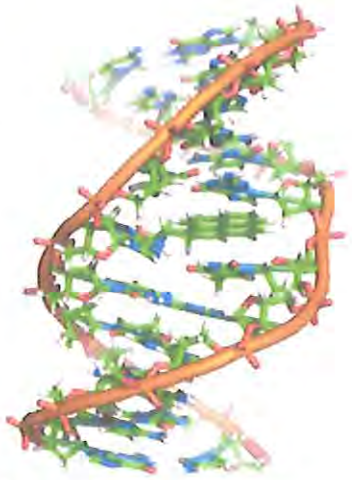
cyclooxygenase.[25] Such mutagens are called promutagens.

Physical mutagens

- Ionizing radiations such as X-rays, gamma rays and alpha particles may cause DNA breakage and other damages. The most common sources include cobalt-60 and cesium-137.
- Ultraviolet radiations with wavelength above 260 nm are absorbed strongly by bases, producing pyrimidine dimers, which can cause error in replication if left uncorrected.
- Radioactive decay, such as ^{14}C in DNA which decays into nitrogen.

DNA reactive chemicals

A large number of chemicals may interact directly with DNA. However, many such as PAHs, aromatic amines, benzene are not necessarily mutagenic by themselves, but through metabolic processes in cells they produce mutagenic compounds.



A DNA adduct (at center) of benzo[*a*]pyrene, the major mutagen in tobacco smoke.

- Reactive oxygen species (ROS) – These may be superoxide, hydroxyl radicals and hydrogen peroxide, and large number of these highly reactive species are generated by normal cellular processes, for example as a by-products of mitochondrial electron transport, or lipid peroxidation. As an example of the latter, 15-hydroperoxyicosatetraenocic acid, a natural product of cellular cyclooxygenases and lipoxygenases, breaks down to form 4-hydroxy-2(*E*)-nonenal, 4-hydroperoxy-2(*E*)-nonenal, 4-oxo-2(*E*)-nonenal, and *cis*-4,5-epoxy-2(*E*)-decanal; these bifunctional electophils are mutagenic in mammalian cells and may contribute to the development and/or progression of human cancers (see 15-Hydroxyicosatetraenoic acid).[26] A number of mutagens may also generate these ROS. These ROS may result in the production of many base adducts, as well as DNA strand breaks and crosslinks.
- Deaminating agents, for example nitrous acid which can cause transition mutations by converting cytosine to uracil.
- Polycyclic aromatic hydrocarbon (PAH), when activated to diol-epoxides can bind to DNA and form adducts.
- Alkylating agents such as ethylnitrosourea. The compounds transfer methyl or ethyl group to bases or the backbone phosphate groups. Guanine when alkylated may be mispaired with thymine. Some may cause DNA crosslinking and breakages. Nitrosamines are an important group of mutagens found in tobacco, and may also be formed in smoked meats and fish via the interaction of amines in food with nitrites added as preservatives. Other alkylating agents include mustard gas and vinyl chloride.
- Aromatic amines and amides have been associated with carcinogenesis since 1895 when German physician Ludwig Rehn observed high incidence of bladder cancer among workers in German synthetic aromatic amine dye industry. 2-Acetylaminofluorene, originally used as a pesticide but may also be found in cooked meat, may cause cancer of the bladder, liver, ear, intestine, thyroid and breast.
- Alkaloid from plants, such as those from Vinca species, may be converted by metabolic processes into the active mutagen or carcinogen.
- Bromine and some compounds that contain bromine in their chemical structure.
- Sodium azide, an azide salt that is a common reagent in organic synthesis and a component in many car airbag systems
- Psoralen combined with ultraviolet radiation causes DNA cross-linking and hence chromosome breakage.
- Benzene, an industrial solvent and precursor in the production of drugs, plastics, synthetic rubber and dyes.

Base analogs

- Base analog, which can substitute for DNA bases during replication and cause transition mutations.

Intercalating agents

- Intercalating agents, such as ethidium bromide and proflavine, are molecules that may insert between bases in DNA, causing frameshift mutation during replication. Some such as daunorubicin may block transcription and replication, making them highly toxic to proliferating cells.

Metals

Many metals, such as arsenic, cadmium, chromium, nickel and their compounds may be mutagenic, but they may act, however, via a number of different mechanisms.[27] Arsenic, chromium, iron, and nickel may be associated with the production of ROS, and some of these may also alter the fidelity of DNA replication. Nickel may also be linked to DNA hypermethylation and histone deacetylation, while some metals such as cobalt, arsenic, nickel and cadmium may also affect DNA repair processes such as DNA mismatch repair, and base and nucleotide excision repair.[28]

Biological agents

- Transposon, a section of DNA that undergoes autonomous fragment relocation/multiplication. Its insertion into chromosomal DNA disrupt functional elements of the genes.
- Virus – Virus DNA may be inserted into the genome and disrupts genetic function. Infectious agents have been suggested to cause cancer as early as 1908 by Vilhelm Ellermann and Oluf Bang,[29] and 1911 by Peyton Rous who discovered the Rous sarcoma virus.[30]
- Bacteria – some bacteria such as *Helicobacter pylori* cause inflammation during which oxidative species are produced, causing DNA damage and reducing efficiency of DNA repair systems, thereby increasing mutation.

Protection against mutagens

Antioxidants are an important group of anticarcinogenic compounds that may help remove ROS or potentially harmful chemicals. These may be found naturally in fruits and vegetables.[31] Examples of antioxidants are vitamin A and its carotenoid precursors, vitamin C, vitamin E, polyphenols, and various other compounds. β-Carotene is the red-orange colored compounds found in vegetables like carrots and tomatoes. Vitamin C may prevent some cancers by inhibiting the formation of mutagenic N-nitroso compounds (nitrosamine). Flavonoids, such as EGCG in green tea, have also been shown to be effective antioxidants and may have anti-cancer properties. Epidemiological studies indicate that a diet rich in fruits and vegetables is associated with lower incidence of some cancers and longer life expectancy,[32] however, the effectiveness of antioxidant supplements in cancer prevention in general is still the subject of some debate.[32][33]

Fruits and vegetables are rich in antioxidants.

Other chemicals may reduce mutagenesis or prevent cancer via other mechanisms, although for some the precise mechanism for their protective property may not be certain. Selenium, which is present as a micronutrient in vegetables, is a component of important antioxidant enzymes such as gluthathione peroxidase. Many phytonutrients may counter the effect of mutagens; for example, sulforaphane in vegetables such as broccoli has been shown to be protective against prostate cancer.[34] Others that may be effective against cancer include indole-3-carbinol from cruciferous vegetables and resveratrol from red wine.[35]

An effective precautionary measure an individual can undertake to protect themselves is by limiting exposure to mutagens such as UV radiations and tobacco smoke. In Australia, where people with pale skin are often exposed to strong sunlight, melanoma is the most common cancer diagnosed in people aged 15–44 years.[36][37]

In 1981, human epidemiological analysis by Richard Doll and Richard Peto indicated that smoking caused 30% of

cancers in the US.[38] Diet is also thought to cause a significant number of cancer, and it has been estimated that around 32% of cancer deaths may be avoidable by modification to the diet.[39] Mutagens identified in food include mycotoxins from food contaminated with fungal growths, such as aflatoxins which may be present in contaminated peanuts and corn; heterocyclic amines generated in meat when cooked at high temperature; PAHs in charred meat and smoked fish, as well as in oils, fats, bread, and cereal;[40] and nitrosamines generated from nitrites used as food preservatives in cured meat such as bacon (ascobate, which is added to cured meat, however, reduces nitrosamine formation).[31] Excessive alcohol consumption has also been linked to cancer; the possible mechanisms for its carcinogenicity include formation of the possible mutagen acetaldehyde, and the induction of the cytochrome P450 system which is known to produce mutagenic compounds from promutagens.[41]

For certain mutagens, such as dangerous chemicals and radiations, as well as infectious agents known to cause cancer, government legislations and regulatory bodies are necessary for their control.

Mutagen test systems

Many different systems for detecting mutagen have been developed.[42][43] Animal systems may more accurately reflect the metabolism of human, however, they are expensive and time-consuming (may take around three years to complete), they are therefore not used as a first screen for mutagenicity or carcinogenicity.

Bacterial systems

- **Ames test** – This is the most commonly used test, and *Salmonella typhimurium* strains deficient in histidine biosynthesis are used in this test. The test checks for mutants that can revert to wild-type. It is an easy, inexpensive and convenient initial screen for mutagens.
- **Resistance to 8-azaguanine in *S. typhimurium*** – Similar to Ames test, but instead of reverse mutation, it checks for forward mutation that confer resistance to 8-Azaguanine in a histidine revertant strain.
- ***Escherichia coli* systems** – Both forward and reverse mutation detection system have been modified for use in *E. coli*. Tryptophan-deficient mutant is used for the reverse mutation, while galactose utility or resistance to 5-methyltryptophan may be used for forward mutation.
- **DNA repair** – *E. coli* and *Bacillus subtilis* strains deficient in DNA repair may be used to detect mutagens by their effect on the growth of these cells through DNA damage.

Yeast

Systems similar to Ames test have been developed in yeast. *Saccharomyces cerevisiae* is generally used. These systems can check for forward and reverse mutations, as well as recombinant events.

Drosophila

Sex-Linked Recessive Lethal Test – Males from a strain with yellow bodies are used in this test. The gene for the yellow body lies on the X-chromosome. The fruit flies are fed on a diet of test chemical, and progenies are separated by sex. The surviving males are crossed with the females of the same generation, and if no males with yellow bodies are detected in the second generation, it would indicate a lethal mutation on the X-chromosome has occurred.

Plant Assays

Plants such as *Zea mays*, *Arabidopsis thaliana* and *Tradescantia* have been used in various test assays for mutagenecity of chemicals.

Cell culture assay

Mammalian cell lines such as Chinese hamster V79 cells, Chinese hamster ovary (CHO) cells or mouse lymphoma cells

may be used to test for mutagenesis. Such systems include the **HPRT assay** for resistance to 8-azaguanine or 6-thioguanine, and **ouabain-resistance (OUA) assay**.

Rat primary hepatocytes may also be used to measure DNA repair following DNA damage. Mutagens may stimulate unscheduled DNA synthesis that results in more stained nuclear material in cells following exposure to mutagens.

Chromosome check systems

These systems check for large scale changes to the chromosomes and may be used with cell culture or in animal test. The chromosomes are stained and observed for any changes. **Sister chromatid exchange** is a symmetrical exchange of chromosome material between sister chromatids and may be correlated to the mutagenic or carcinogenic potential of a chemical. In **micronucleus Test**, cells are examined for micronuclei, which are fragments or chromosomes left behind at anaphase, and is therefore a test for clastogenic agents that cause chromosome breakages. Other tests may check for various chromosomal aberrations such as chromatid and chromosomal gaps and deletions, translocations, and ploidy.

Animal test systems

Rodents are usually used in animal test. The chemicals under test are usually administered in the food and in the drinking water, but sometimes by dermal application, by gavage, or by inhalation, and carried out over the major part of the life span for rodents. In tests that check for carcinogens, maximum tolerated dosage is first determined, then a range of doses are given to around 50 animals throughout the notional lifespan of the animal of two years. After death the animals are examined for sign of tumours. Differences in metabolism between rat and human however means that human may not respond in exactly the same way to mutagen, and dosages that produce tumours on the animal test may also be unreasonably high for a human, i.e. the equivalent amount required to produce tumours in human may far exceed what a person might encounter in real life.

Mice with recessive mutations for a visible phenotype may also be used to check for mutagens. Females with recessive mutation crossed with wild-type males would yield the same phenotype as the wild-type, and any observable change to the phenotype would indicate that a mutation induced by the mutagen has occurred.

Mice may also be used for **dominant lethal assays** where early embryonic deaths are monitored. Male mice are treated with chemicals under test, mated with females, and the females are then sacrificed before parturition and early fetal deaths are counted in the uterine horns.

Transgenic Mouse Assay using a mouse strain infected with a viral shuttle vector is another method for testing mutagens. Animals are first treated with suspected mutagen, the mouse DNA is then isolated and the phage segment recovered and used to infect *E. coli*. Using similar method as the blue-white screen, the plaque formed with DNA containing mutation are white, while those without are blue.

Use of mutagen in anti-cancer therapy

Many mutagens are highly toxic to proliferating cells, and they are often used to destroy cancer cells. Alkylating agents such as cyclophosphamide and cisplatin, as well as intercalating agent such as daunorubicin and doxorubicin may be used in chemotherapy. Ionizing radiations are used in radiation therapy.

Mutagens in fiction

In science fiction, mutagens are often represented as substances that are capable of completely changing the form of the recipient or gaining them superpower. Powerful radiations are the agents of mutation for the superheroes in Marvel Comics's Fantastic Four, Daredevil, and Hulk, while in the Teenage Mutant Ninja Turtles franchise the mutagen is chemical agent called the Ooze, and for Inhumans the mutagen is the Terrigen Mist. Mutagens are also featured in television series, computer and video games, such as the *Cyberia*, *The Witcher*, *Metroid Prime: Trilogy*, *Resistance: Fall of Man*, *Resident Evil*, *Infamous*, *Command & Conquer*, *Gears of War 3*, and *Fallout*.

See also

- Antimutagen
- Carcinogen
- DNA repair
- Ethyl methanesulfonate (EMS)
- Genetics
- Genotoxicity
- Mutation
- Pesticide
- Teratology

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Recochem Inc.
COOLANT EXPERTS

Coola

\\ COOLANT OVERVIEW \\ PRODUCTS \\ R&D TECHNOLOGY & TESTING \\ COOLANT STORAGE, HANDLING & TRANSPORTATI

Traditional Coolant

- Also referred to as conventional coolant
- Corrosion Inhibitors based on inorganic salts; borate, nitrate, nitrite, phosphate, mo
- There are generally two versions of conventional coolant
  - Automotive which is typically green in color
  - Heavy duty which typically is purple or green

- Limited lifespan: Automotive is typically up to 2 years or 80,000 km (48,000 miles); to 3,000 hours or 300,000 km (180,000 miles). This life can be extended through the coolant additives (SCA's)

The corrosion inhibitor chemistry used in traditional coolants comes in two main type

The light duty version is typically nitrite free and can be based on

- Borate, silicate, nitrate
- Borate / phosphate, silicate, nitrate
- Phosphate, silicate, nitrate

The heavy duty diesel products are a nitrite or nitrite/molybdate version of the chemi version mentioned above.

This corrosion inhibitor chemistry will protect coolant system metals such as copper, iron and aluminum against cavitation and corrosion and when used in the automotive recommended for use in older model vehicles. The nitrite or nitrite / molybdate corro have been found to provide excellent wet sleeve liner cavitation protection when use applications. However these corrosion inhibitors rapidly deplete in service resulting i coolant or when designed and used in heavy duty diesel applications require the add service intervals to ensure satisfactory protection of an engine cooling system.

These conventional coolants no longer are used as factory-fill in automobiles and ligl heavy duty diesel OEMs still factory fill with traditional coolants in part of their produc application, such fluids are referred to as "Fully Formulated" coolant since they can b duty and heavy duty diesel vehicles. Such fluid historically formed the majority of afte however recently they have been supplanted by newer coolant based on OAT or Hyb

Complete product line of Traditional formulas

Material Safety Data Sheet
WF1001N
Coolant Additives

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product Number: NAPA 4055, 4056, 4057, 4058

Trade Name and Synonyms: NAPA Kool Coolant Additive

Chemical Name and Synonyms: Nitrite-nitrate-borate, sodium hydroxide corrosion inhibitor.
Chemical Family: Industrial water treatment
Product Use: Vehicle coolant treatment
MSDS Date of Preparation: April 29, 2012

Company Identification
Manufacturer
NAPA Filters
PO Box 1967
Gastonia, NC 28053

Telephone Numbers
Product Information: (704) 869-3700 x2769
Emergency Phone: (800) 424-9300 Chemtrec

SECTION 2: HAZARDS IDENTIFICATION

Physical Appearance: Red colored liquid. Mild odor.

EMERGENCY OVERVIEW

Hazards Identification: May cause severe eye and skin irritation or burns. Repeated skin contact may cause allergic skin reaction. Inhalation of mists may cause irritation of the nose, throat and upper respiratory tract. Ingestion may be fatal.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	Amount
Sodium Borate	1303-96-4	<10%
Sodium Nitrite	7632-00-0	<5%
Sodium Nitrate	7631-99-4	<5%
2-Mercaptobenzothiazole	149-30-4	<5%
Sodium Hydroxide	1310-73-2	<2%

SECTION 4: FIRST AID MEASURES

Eye Contact: Flush eyes thoroughly with running water for at least 15 minutes. Get immediate medical attention.

Skin Contact: Flush with water for at least 15 minutes then wash with mild soap and water. Seek medical attention if irritation develops.

Inhaled: If mists are inhaled, remove to fresh air. Seek immediate medical attention.

Swallowed: If swallowed, do not induce vomiting. Rinse mouth with water and drink 1-2 glasses of water. Seek immediate medical attention.

SECTION 5: FIRE FIGHTING MEASURES

Fire and Explosion Hazards: This product contains approximately 80% water and is not flammable or combustible. Dried product (after the water has evaporated) is classified as an oxidizer. Contact of dried residue with flammable or combustible material including clothing may cause fire. Dust clouds from dried product may be explosive. Explosion is possible if residue is heated above 1000°F or when mixed with cyanides. Dried residue will ignite with friction when contaminated with organic materials (grass, sawdust, soils, etc.).

Extinguishing Media: Use any media that is appropriate for the surrounding fire.

Special Fire Fighting Procedures: Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing. Cool fire exposed containers and structures with water.

Hazardous Combustion Products: Carbon oxides, oxides of nitrogen, boron oxides, oxides of sulfur and sodium oxides.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Use appropriate protective clothing and equipment during clean-up. Absorb small spills with an inert (non-combustible) absorbent and place in a container for disposal. Do NOT use sawdust, rags or any other combustible material. Combustible absorbents may catch fire as they dry in contact with this product. Contain large spills with sand or earth. Do not use combustible materials. Pump liquid into holding tanks. Collect residue with an inert absorbent as described above for small spills. Prevent release to the environment.

SECTION 7: HANDLING AND STORAGE

Avoid generating and breathing mists and avoid contact with eyes, skin or clothing. Use only with adequate ventilation. Keep product away from heat and all flammable or combustible materials including paper, solvents, fuels, wooden floors and clothing. Wash thoroughly after handling. Remove and launder contaminated clothing before reuse. DO NOT allow product to dry on clothing.

Storage: Store in a cool, dry, well-ventilated area away from combustible materials and acids.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Name	Exposure Limits
Sodium borate	2 mg/m3 TWA, 6 mg/m3 STEL ACGIH TLV (inhalable)
Sodium nitrite	None Established
Sodium nitrate	None Established
2-Mercaptobenzothiazole	5 mg/m3 TWA skin AIHA WEEL
Sodium Hydroxide	2 mg/m3 TWA OSHA PEL, 2 mg/m3 Ceiling ACGIH TLV

Ventilation: Use with adequate general or local exhaust ventilation to maintain exposure concentrations below the exposure limits.

Respiratory Protection: For operations where exposures are excessive or irritation is experienced, a NIOSH approved respirator should be used. Respirator selection and use should be based on contaminant type, form and concentration. Follow OSHA 1910.134, ANSI Z88.2 and good Industrial Hygiene practice.

Skin Protection: Wear rubber or other impervious gloves.

Eye Protection: Chemical safety goggles.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Red-colored liquid with a mild odor
Specific Gravity: 1.170
Water Solubility: Soluble
Vapor Pressure: Same as water
Vapor Density: Same as water
pH: 11.3
Boiling Point: 102°C (216°F)
Melting Point: Not determined
Flash Point: None
Autoignition Point: None

SECTION 10: STABILITY AND REACTIVITY

Stability: This product is stable.

Incompatibility/Conditions to Avoid: Avoid extreme heat. Prevent contact with all flammable or combustible materials including paper, solvents, fuels, wooden floors and clothing, strong acids, reducing agents, ammonium compounds, cyanides.

Hazardous Decomposition Products: Thermal decomposition will generate carbon oxides, oxides of nitrogen, boron oxides, oxides of sulfur and sodium oxides.

Hazardous Polymerization: Will not occur

SECTION 11: TOXICOLOGICAL INFORMATION

Potential Health Effects:

Eye: May cause severe irritation or burns.

Skin: May cause irritation. Sodium nitrite and sodium borate may be harmful if absorbed through the skin. Repeated skin contact may cause allergic skin reaction.

Inhalation: Mists may cause irritation of the mucous membranes and upper respiratory tract. Absorption may cause effects similar to those described under ingestion.

Ingestion: May be fatal if swallowed. May cause burns to the mouth and throat, dizziness, nausea, vomiting, low blood pressure, cyanosis, rapid heart beat, convulsions and collapse.

Chronic/Carcinogenicity: Prolonged or repeated exposure may cause nervous system effects, liver damage, kidney damage and effects on the blood. Sodium borate causes adverse reproductive effects in laboratory animals. None of the components of this product present at 0.1% or greater are listed as carcinogens by ACGIH, IARC, NTP or OSHA.

SECTION 12: ECOLOGICAL INFORMATION

No ecotoxicity data is available for the product. Sodium nitrite and 2-mercaptobenzothiazole are considered toxic to the aquatic environment. Avoid release to the environment.

SECTION 13: DISPOSAL INFORMATION

Dispose in accordance with all local and national regulations.

SECTION 14: TRANSPORT INFORMATION

US DOT Shipping Description: Not regulated

IMDG Code (Ocean): Not regulated

ICAO/IATA (AIR): Not regulated

Note: If a package contains 2000 lbs or more, the shipping description is UN3082, Environmentally Hazardous Substance, liquid, n.o.s. (Sodium Nitrite), 9, III RQ

SECTION 15: REGULATORY INFORMATION

CERCLA 103 Reportable Quantity: This product has a reportable quantity of 2000 lbs based on 5% sodium nitrite with an RQ of 100 lbs. Many states have more stringent reporting requirements. Report releases as required by all federal, state and local authorities.

SARA TITLE III:

Hazard Category for Section 311/312: Acute health, chronic health

Section 313 Toxic Chemicals: This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements:
Sodium nitrite <5%
Sodium nitrate (nitrate compound) <5%
2-Mercaptobenzothiazole <5%

Section 302 Extremely Hazardous Substances (TPQ): None

EPA Toxic Substances Control Act (TSCA) Status: All of the components of this product are listed on the TSCA inventory.

SECTION 16: OTHER INFORMATION

NFPA Hazard Rating: Health: 3 Fire: 0 Instability: 0

HMIS Hazard Rating: Health: 3 Fire: 0 Physical Hazard: 0

The information is believed to be accurate and represents the best information currently available to us. WE MAKE NO WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY,

Compliance Summary

Compliance Summary Tool

- Road
- Rail
- Air
- Water

Transportation Modes

- Road
- Rail
- Air
- Water
- Intermodal

Service Functions

- Terminals & Facilities
- Vehicles, Cargo
- Fuel

Regulations

- Air Quality
- Water & Wastewater
- Solid & Hazardous Wastes
- Spills & Releases

All Topics

- See Current Topics
- See Future Topics

Please note: This summary is provided to help you understand the regulations. Consult the references provided for links to the full text of the regulations.

Locomotive Coolant Discharge

Unlike car and truck engines, most locomotives in the U.S. are cooled with water that contains anti-corrosion inhibitors, but does not contain antifreeze compounds. Because of this, locomotive cooling systems may need to be drained when engines are shut down during road operation in cold weather. Failure to do so can result in serious engine damage due to freezing of the coolant.

This page covers rules for the discharge of locomotive coolant.

- Who is covered by the regulations?
- What is the purpose of the regulations?
- Regulations
- More Resources

Related topic: Engine Emissions (Locomotives).

Who is covered by the regulations?

When discharged, locomotive coolant is considered industrial wastewater. The Clean Water Act made it unlawful for all businesses to discharge industrial wastewater unless a permit was obtained.

What is the purpose of the regulations?

To protect the cooling system from corrosion, locomotive coolants contain a dilute additive package, which is basically a mixture of sodium borate and sodium nitrate

If coolants are discharged to the ground or a receiving stream, these additives, although dilute, may pollute the nearby drinking water supplies or waterways.

Regulations

The Clean Water Act made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. The CWA also limits discharges from businesses to a municipal sewer system (also called Publically Owned Treatment Works or POTW).

Wastewater discharged from locomotive cooling systems is regulated in one of several different ways, depending on how it is disposed. There are three primary options for disposing of locomotive coolant wastewater:

1. Haul it to a treatment facility.
2. Discharge it to a municipal sanitary sewer system (also known as a Publically Owned Treatment Works or POTW).
3. Discharge it to a stream or other water body.

Most railroad operators use option 1 or 2 for locomotive coolant. Each option is discussed below.

Option 1- Hauling
Option 1 is an economical solution when there is a sufficiently small volume of wastewater generated. Before you haul wastewater you must perform a Hazardous Waste Determination. This may involve getting it tested by a laboratory. If the wastewater is "hazardous" you must manage, transport and dispose of it using special procedures. For more information, see the TERC Hazardous Waste section. If the wastewater is non-hazardous, then you should maintain test records that support your determination.

Option 2 - Discharge to a POTW
Discharging to a Publically Owned Treatment Works is referred to as an "indirect discharge," because your wastewater is going to a POTW before it is subsequently discharged to a stream or other water body. This is viable when the facility is located in an area served by a municipal sanitary sewer system. Before you initiate option 2 you must acquire a permit or written notification from either your local sewer district or state environmental agency. You will also have to meet certain rules found in federal and state regulations, including:

- You are prohibited from discharging any pollutant, including oil, that may upset or interfere with the sewage treatment processes or pass through the system untreated;
- You cannot discharge pollutants (e.g., solvents) that may cause a fire in the sewer system; and
- You cannot discharge pollutants such as sludge (e.g., grease, dirt) that may clog the sewer system.

To meet sewer discharge standards, you may need to install equipment such as an oil/water separator to prevent oil and sludge from being discharged to the sewer. This is referred to as "pretreatment." The oil and sludge collected by pretreatment equipment will have to be periodically removed and disposed of, possibly as a hazardous waste (you must make a hazardous waste determination). Other types of treatment that are commonly employed with wastewater include pH adjustment, settling, and metals precipitation processes. For more information see Pretreatment Standards and Limits.

Option 3 - Discharge to a Stream
Discharging to a stream or other water source (called "direct discharge") is a potential option, but one that requires a National Pollutant Discharge Elimination System (NPDES) permit (or state equivalent). If you obtain this type of permit, you will be required to meet discharge standards (usually much more stringent than indirect discharge standards) and demonstrate that you are in compliance by frequently collecting samples of your wastewater and having them analyzed at a laboratory. You will also have significant reporting and recordkeeping responsibilities. For more information see NPDES.

More Resources

Environmental Aspects of Railroad Locomotive Coolant Discharge (Ted A. Ronning, Christopher P. L. Barkan), possibly available through Association of American Railroads.

The Railway Technical Web Pages website provides a useful overview of Diesel Locomotive Technology, including a section on Engine Cooling.

Trainorders.com

Eastern Railroad Discussion > Locomotive cooling, Water only?

Date: 02/09/07 23:16
Locomotive cooling, Water only?
Author: LVfan

The recent cold weather here in the east has raised a question where I work about locomotive cooling systems. I remember reading somewhere, perhaps last year or so on this forum that locomotives use only water in their cooling systems even in the deep cold of winter, no anti freeze is used. Is this correct? If so, what are the reasons that railroads do not use any anti-freeze and if locomotive sit over night or for several days do they freeze up? I seem to recall there was a specific reason that it is water only but I don't remember.....so I can't answer my friends question. Thanks in advance.

Frank

[Reply To This Message] [Quote]

Date: 02/09/07 23:43
Re: Locomotive cooling, Water only?
Author: redneckrailfan

LVfan Wrote:

> The recent cold weather here in the east has
> raised a question where I work about locomotive
> cooling systems. I remember reading somewhere,
> perhaps last year or so on this forum that
> locomotives use only water in their cooling
> systems even in the deep cold of winter, no anti
> freeze is used. Is this correct? If so, what are
> the reasons that railroads do not use any
> anti-freeze and if locomotive sit over night or
> for several days do they freeze up? I seem to
> recall there was a specific reason that it is
> water only but I don't remember.....so I can't
> answer my friends question. Thanks in advance.
>
> Frank

that is correct, most locomotives due not use antifreeze in the cooling system, including both EMD and GE products. In the case of EMD units it is due to the fact the the engine block is fabricated and should there be a leak which allows cooling water into the crankcase the antifreeze will cause the bearings to seize. There is one exception and that is with the 265H prime mover, which apparently uses a cast engine block
Supposedly GE units with the FDL prime mover could use antifreeze but I have never heard of any units having antifreeze added. The short lived HDL prime mover fund on the AC6000CW did use antifreeze. The EVO prime mover, which is heavily based on the HDL, should be antifreeze compatible as well.

Bryan Jones
Brooks, KY
Bryan's Train Photos

[Reply To This Message] [Quote]

Date: 02/10/07 05:33
Re: Locomotive cooling, Water only?
Author: Jaap

With cooling systems of 265 gallon and more(530 gallon on a AC6000CW) the EPA does not like antifreeze and neither does the railroad.
any cooling off heating cycle brings leaks in both engine and connections from engines to water tank, radiator etc.
The EPA does not like the spills , the railroad does not like the cost.
Water is available at any yard /service facility and can be filled fast to get locomotive active again, antifreeze is not and half the time it would need to be pumped in with a hand pump.
The water system is protected by Ogonz valve under frame that stays warm as long as water is circulating, if engine stops for some reason the Ogonz valve cools off and dumps water if temp drops below 50 degrees.
This valve protects the engine from freezing.
Only additive in water is a corrosion inhibitor (pink stuff)which is not harmful to environment

[Reply To This Message] [Quote] NOT SO. CHECK MSDS

Date: 02/10/07 06:36
Re: Locomotive cooling, Water only?
Author: KV1guy

Your info is not correct. The SD90MAC H loco did use antifreeze. I remember reading about it in the manual for it.

[Reply To This Message] [Quote]

Date: 02/10/07 06:57
Re: Locomotive cooling, Water only?
Author: Robbman

KV1guy Wrote:

> Your info is not correct. The SD90MAC H loco did
> use antifreeze. I remember reading about it in
> the manual for it.

redneckrailfan Wrote:

>There is one exception and that is with the 265H prime mover,
>which apparently uses a cast engine block

[Reply To This Message] [Quote]

Date: 02/10/07 07:19
Re: Locomotive cooling, Water only?
Author: Jaap

Do not confuse locomotives that can and those that actually do.
Most Railroads will run water even if the engine will accept antifreeze just due to cost and reasons I stated above.

[Reply To This Message] [Quote]

Date: 02/10/07 07:44
Re: Locomotive cooling, Water only?
Author: br549

I know of couple of shortline railroads that use antifreeze in their GP9's and GP10's. Saves fuel but man ... it's hard on those diesels when you start them on Monday morning and they've sat all weekend!

[Reply To This Message] [Quote]

Date: 02/10/07 08:01
Re: Locomotive cooling, Water only?
Author: jcmark

I think the quick and easy answer is, since most locomotives are never shut down, they have no need for anti-freeze.

Those that do still still for extended periods in the winter, its still probably cheaper to burn the fuel than fill the cooling system with anti-freeze.

[Reply To This Message] [Quote]

Date: 02/10/07 08:10
Re: Locomotive cooling, Water only?
Author: Jaap

br549 Wrote:

> I know of couple of shortline railroads that use
> antifreeze in their GP9's and GP10's. Saves fuel
> but man ... it's hard on those diesels when you
> start them on Monday morning and they've sat all
> weekend!

So far they may be lucky but running a glycol based antifreese in a GP9 or simmilar locomotive will cost you new engine block sooner or later.
The Glycol once it entes the oil will severly damage crankcase bearings and destroy the engine.

[Reply To This Message] [Quote]

Date: 02/10/07 08:17
Re: Locomotive cooling, Water only?
Author: greendot

Historically, locomotives were never designed for antifreeze. The only conventional locomotives ever designed for-and-built using 50:50 antifreeze were the 6000 HP EMD SD90ACs (62 for UP and 4 for CP), which explains their huge "wing" radiators. Antifreeze-water mixture always absorbs or carries less waste heat from the engine during warm weather than ordinary water, so a locomotive with antifreeze mixture in the cooling system has to have larger radiators to carry off andf disperse the same amount of heat. If you took an ES44AC, for example, and filled the cooling system with 50:50 antifreeze-water mix, the engine would still run, but come summertime, the engine would overheat because the radiator isn't big enough to quickly get rid of the engine heat now carried off by the ordinary water.

(Actually, locomotives don't really use "ordindary" water; it is supposed to have a corrosion inhibitor powder or liquid added, because ordinary "tap" water can turn slightly acidic inside a big engine and start corroded the parts. The corrosion inhibiotr keeps the water slightly "basic" [chemical speak for opposite-of-acidic].)

Take today's SD70ACe's or ES44ACs and use antifreeze-water mix instead of water ... and you will end up doing one of two things: (1) reduce the engine horsepower drastically in warm weather (and in tunnels) because the antifreeze-water mix cannot carry off sufficient waste heat from the engine, or (2) modify the locomotive with really larger radiators (which you can't easily do without making the locomotive too high or too wide ... lengthening the locomotive isn't easy, cheap or practical).

Someone said there's no reason to shut down locomotives. Not so. There has been increasing pressure for years on the railroads to stop idling engines unnecessarily. This is what has driven the use of "AESS" (auto engine start-stop) on EMD and GE units of recent production and aftermarket systems which railroads are putting on older power, like standy diesel heaters or bolt-on engine start-stop systems.

[Reply To This Message] [Quote]

Date: 02/10/07 08:34
Re: Locomotive cooling, Water only?
Author: kgmontreal

CPR's Cat re-engined M-636 #4711 used anti-freeze.

While on the subject, does anyone else remember the green treatment chemical added to units' cooling systems in the 1960's? I think it was called "Cholorhene NU" or something close to that. It used to leave bright green stains on the carbody when it leaked out of the cooling system overflow.

KG

[Reply To This Message] [Quote]

Date: 02/10/07 13:33
Re: Locomotive cooling, Water only?
Author: greendot

Jaap Wrote:

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> gallon on a AC6000CW) the EPA does not like
> antifreeze and neither does the railroad.
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> engine and connections from engines to water tank,
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> The EPA does not like the spills , the railroad
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> again, antifreeze is not and half the time it
> would need to be pumped in with a hand pump.
> The water system is protected by Ogonz valve
> under frame that stays warm as long as water is
> circulating, if engine stops for some reason the
> Ogonz valve cools off and dumps water if temp
> drops below 50 degrees.
> This valve protects the engine from freezing.
> Only additive in water is a corrosion inhibitor
> (pink stuff)which is not harmful to environment

NOT SO. ONCE ANTIFREEZE IS DRAINED VALVES ARE ADDED TO PREVENT FREEZING

In fact, the EMD 6000 HP SD90ACs were built WITHOUT automatic water drain valves, because there is no reason to automatically dump the coolant. On UP, the manual water drain valves were, in fact, locked with padlocks when they first operated on UP.

[Reply To This Message] [Quote]

Date: 02/10/07 13:38
Re: Locomotive cooling, Water only?
Author: greendot

---

kgmontreal Wrote:

> CPR's Cat re-engined M-636 #4711 used
> anti-freeze.
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> While on the subject, does anyone else remember
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> called "Cholorhene NU" or something close to that.
> It used to leave bright green stains on the
> carbody when it leaked out of the cooling system
> overflow.

>
> KG

Locomotive cooling systems were historically treated with a chromate-type corrosion inhibitor. When a locomotive developed any decent sized leak in the radiator cores or coolant system pipes, you'd probably see huge "lime green" icicles on the carbody.

Chemicals containing chromate compounds are, for many years now, considered hazardous because of the effects of chrome and chrome compounds if ingested. So, many years ago, locomotive cooling system corrosion inhibitor products were all changed from chromate-based to borate-based (using boron compounds). Today's borate treatments are packaged as either powders or concentrated liquids, and usually result in the locomotive cooling water having a purplish-red tint (to differentiate it from the older chromate lime-green color).

[Reply To This Message] [Quote]

Date: 02/10/07 13:43
Re: Locomotive cooling, Water only?
Author: Jaap

Correct but those locomotives have closed (pressurized) cooling systems, 90% of locomotives in US have atmospheric cooling systems with dry radiators.
putting Glycol antifreeze in tose only has water evaporate and mixture gets all out of proportions.
there are very few locomotives that actualy run with antifreeze, even if they could.

[Reply To This Message] [Quote]

Date: 02/10/07 19:03
Re: Locomotive cooling, Water only?
Author: EMDSW-1

Common practice is to leave them running when it gets cold. If you shut them down and drain them, then you have to wait until the weather warms up to get water in them. If there is no a problem getting water to them, you still have to wait until it gets warm enough to get them started and most units don't have brand new full-capacity batteries and won't crank them anyway. Although most are protected by a 400 amp starting fuse, I've seen the tops actually blown off batteries or the posts melted trying to start a cold unit.

A few gallons of diesel burned to keep one running is money WELL SPENT!

[Reply To This Message] [Quote]

Date: 02/11/07 08:16
Re: Locomotive cooling, Water only?
Author: prionw

I recall reading an article long ago about a locomotive add-on package that included a small diesel engine (like a small gen-set) which would be run in cold weather when the main engine is shut down. The small diesel would keep the batteries charged and main engine coolant warm. Has any railroad ever installed these?

Thanks,

WP

[Reply To This Message] [Quote]

Date: 02/11/07 11:22
Re: Locomotive cooling, Water only?
Author: Jaap

---

yes several north East railroads have them in use, including CSX I believe, CSX also uses auto

start on some of their engines.

[Reply To This Message] [Quote]

Date: 02/11/07 16:16
Re: Locomotive cooling, Water only?
Author: Robbman

Jaap Wrote:

> yes several north East railroads have them in use,
> including CSX I believe, CSX also uses auto start
> on some of their engines.

All the Class 1s use them...

AESS is GE's Auto Engine Start/Stop
https://www.getransportation.com/general/locomotives/parts/GE/Fuel.asp

EMD has Autostart
http://www.emdiesels.com/en/locomotive/innovations/autostart/index.htm

CSX, NS, BNSF and UP have Ecotrans K9 APUs or similar installed on many older units.

[Reply To This Message] [Quote]

Date: 02/11/07 19:14
Re: Locomotive cooling, Water only?
Author: KV1guy

greendot Wrote:

> Historically, locomotives were never designed for
> antifreeze. The only conventional locomotives ever
> designed for-and-built using 50:50 antifreeze were
> the 6000 HP EMD SD90ACs (62 for UP and 4 for CP),
> which explains their huge "wing" radiators.

The wing size had nothing to do with that. SD80MAC's had the same wing section and never used anitfreeze. The wings are built that big for the sheer amount of coolant that needs to be cooled that requires more time in the radiator section to be cooled before it can be returned to the diesel engine.

[Reply To This Message] [Quote]

Date: 02/12/07 05:41
Re: Locomotive cooling, Water only?
Author: smiller54

To add to Robbmann's links

ECOTRANS K9 APU Locomotive Application
http://www1.eere.energy.gov/vehiclesandfuels/pdfs/idling_2004/stewart.pdf

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NOISE, POLLUTION AND VIBRATION

Average train times means we will see a train approximately every 13 minutes, 24 hours per day, 7 days per week.

Trains blow their horns as required by the FRA one-quarter mile before rail crossings and do not stop until the locomotive passes the rail crossing. So combining the noise from the air horns, sounds from railroad crossing, ringing bells, flashing lights and this is happening every 13 minutes. Anyone living within hearing distance which in the country where I live I would hear this five miles away. Now let's factor in the actual noise of the locomotives and the sounds of the rail cars, it is doubtful that anyone would be able to sleep day or night. That means no naps for babies and toddlers.

Impact on livestock – cows wont' milk, chickens won't lay eggs, cattle will be sick and under normal weight. Birds and animals will not be able to communicate with their species. This will force them to leave the area, therefore upsetting the ecosystem. Birds eat bugs, no birds means more bugs, which means more damage to our crops and nuisance to people. The noise will also have an effect on people's general mental health. This will create an unhappy, sick, depressed community. World Health Organization states long term health effects which lower physical, psychological functions of humans and their organ systems. Children are the most vulnerable due to the lack of sleep. Low frequency vibration are a significant detriment on health which affects mental health, performance and social behavior.

This will force families to give up their farms, sell their homes at reduced values to escape the area to save the health of their families.

As I stated before, I worked for the BNSF, I lived in Chicago in close proximity to the railroads and rail yards on the south side. I had to move my family due to health issues caused by poor air quality and noise. My wife and I gave up our jobs, our home, our friends and our families to move 60 miles away to a peaceful cleaner environment where we could live longer, healthier lives.

Vincent Kuznicki
340 s. 350 w.
Valpo. IN. 46385
219-242-4751

ADVERSE HEALTH EFFECTS OF NOISE

The following summary, prepared by Louis Hagler, MD, is taken from a 100+ page World Health Organization Guideline (Guideline for Community Noise) that provides information about the harmful effects of noise on human health. This document can be seen in its entirety at:

http://www.who.int/environmental_information/Noise

Preface

Community noise (also called environmental noise or domestic noise) is defined as noise emitted from all sources except from that arising in the workplace. Many countries have regulated community noises of many types such as that arising from road, rail and air traffic, construction, public work, and noises of various types originating in the neighborhood, such as that from residential and business premises. In large cities throughout the world, as the population grows, there is increasing exposure to community noise that creates an increasingly important public health problem. The Guidelines for Community Noise were prepared as a practical response to the need for action on community noise at the local level, as well as the need for improved legislation and management.

Noise has always been an important environmental problem for humans. In ancient Rome, legislation was enacted to control the noise emitted by the iron-covered wheels of wagons on paving stones, which disrupted sleep and caused annoyance to the citizens. In some cities in Medieval Europe, horse drawn carriages and horses were banned from the streets at night in order to ensure peaceful sleep for the inhabitants. The noise problems of the past pale in significance to those experienced by modern city-dwellers; noise pollution continues to grow in extent, frequency, and severity as a result of population growth, urbanization, and technological developments. The growth in urban noise pollution involves direct and cumulative adverse health effects; it affects future generations by degrading residential, social, and learning environments with corresponding economic losses.

In comparison to other pollutants, the control of environmental noise has been hampered by insufficient knowledge about its effects on humans and about dose-response relationships. However, it is clear that the effects of noise are widespread and impose long-term consequences on health. It is equally clear that guidelines based on health effects of noise are not often taken into account. Studies in Europe suggest that about half of all EU residents live in zones that do not ensure acoustical comfort. At night, it is estimated that over 30% of EU residents are exposed to sound pressure levels (expressed as decibels) that are sufficient to disturb sleep. In the United States, a Noise Control Act was enacted in 1972; however, recent administrations have essentially eliminated any support for activity in this area.

Introduction

The perception of sound in everyday life is essential for human well-being. Unwanted sound and vibration is defined as noise. An adverse effect of noise is defined as a change in the morphology and physiology of an organism that results in impairment of functional capacity, impairment of capacity to compensate for additional stress, or increased susceptibility to the harmful effects of other environmental influences. This definition includes temporary or long-term lowering of the physical, psychological, or social functioning of humans or their organ systems.

Noise Induced Hearing Impairment

Hearing impairment is typically defined as an increase in the threshold of hearing. It is assessed clinically

by audiometry. Depending on severity, hearing impairment can affect a person's ability to carry out the activities of daily living. Worldwide, noise-induced hearing impairment is the most common, irreversible occupational hazard. In addition to occupational noise, environmental noise is an increasingly prevalent risk factor. Men and women have been shown to be at equal risk of noise-induced hearing impairment. The damage caused by both occupational and environmental noise is related to duration and intensity of exposure.

Apart from noise-induced hearing impairment, hearing damage may be due to hereditary or acquired disease, industrial chemicals, ototoxic drugs, accidents, and the normal aging process. Some of these causes may be additive in nature, leading to permanent damage of the part of the inner ear that perceives sound.

There is general agreement that exposure to sound levels less than 70 dB does not cause hearing damage. There is also general agreement that environmental noise in excess of 80dB produces the same degree of hearing impairment as an equivalent occupational noise exposure. Hearing impairment has been shown in young adults and children following a variety of leisure time exposures. These include shooting, riding motorbikes, listening to music in discotheques, concerts, and through headphones.

Large scale, long-term studies have not been done in all at-risk populations. However, the following information may be relevant in considering noise induced hearing loss.

1. Study data suggest that children may be more vulnerable to noise-induced hearing impairment than adults.
2. At high instantaneous sound pressure levels, mechanical damage to the ear may occur.
3. Risk for noise-induced hearing impairment may increase when the noise exposure is combined with exposure to vibration or with exposure to ototoxic drugs or chemicals.

Noise induced hearing impairment is accompanied by abnormal loudness perception (loudness recruitment), distortion (paracusis), and a disturbing ringing in the ears (tinnitus). Tinnitus has become a common risk for individuals attending pop concerts and discotheques. Tinnitus may be temporary or may take on a more permanent character, especially after prolonged exposure.

Given the importance of the problem, occupational noise exposure is fairly well regulated and controlled worldwide. Environmental noise exposure, especially that related to leisure-time activities, has not been controlled in the same way. Given both the increasing number of noisy activities and the increasing exposure duration (such as in loud cars) regulatory activities are to be encouraged. Whereas dose-response data are lacking, based on the limited data that are available, there appears to be no risk to hearing with exposures to 70 dB or less. Daily 1 hour exposure levels should not exceed 85 dB. It is recommended that exposure to sound levels greater than 100 dB should be limited to a 4-hour period and should not occur more than four times per year. Exposure to higher sound pressure levels and greater duration of exposure are significant risk factors. To avoid hearing impairment, impulse noise exposure should never exceed 140 dB peak sound pressure in adults and 120 dB peak sound pressure in children.

Interference with Speech Communication

Noise may interfere with a person's ability of hear and comprehend normal speech. This may result in a number of personal disabilities, handicaps, and behavioral changes. Problems with concentration, fatigue, uncertainty, lack of self confidence, irritation, misunderstandings, decreased working capacity, problems

in interpersonal relations, and a number of stress reactions have been identified. Particularly vulnerable are the elderly, children, and those not familiar with the spoken language.

Effects on Sleep

Uninterrupted sleep is known to be a prerequisite for good physiological and mental functioning of healthy persons. Whereas sleep disturbance is considered to be a major effect of environmental noise, data on the effects of environmental noise on sleep are limited. Recent research on sleep disturbance has been conducted for aircraft noise, road traffic, and railway noise. For example, road traffic noise in excess of 30 dB disturbs sleep. The probability of being awakened increases with the number of noise events per night. When background noise is low, noise exceeding 45 dB should be limited; for sensitive individuals, an even lower level is preferred.

The primary sleep disturbance effects are: difficulty falling asleep, frequent awakenings, waking too early, and alterations of sleep stages and depth, especially a reduction of REM sleep. Other effects of noise during sleep include increased blood pressure, increased heart rate, increased finger pulse amplitude, vasoconstriction, changes in respiration, cardiac arrhythmias, and increased body movement. For each of these, the threshold and response relationships may be different. Studies have shown that the frequency of noise-induced awakenings decreases over eight consecutive nights; however no such habituation has been shown for heart rate and after effects.

Exposure to night-time noise also induces secondary effects, or so-called after effects. These are effects that can be measured the day following the night-time exposure while the person is awake. These include reduced perceived sleep quality, increased fatigue, depressed mood or well being, and decreased performance.

Long-term effects on psychosocial well-being have been related to nocturnal noise exposure. Noise annoyance during the night increases total noise annoyance for the following 24 hours. People exposed to night-time noise report an increased use of sedatives, closed bedroom windows, and use of personal hearing protection. Particularly sensitive groups include the elderly, shift workers, persons vulnerable to physical or mental disorders, and those with sleeping disorders.

Other factors that influence the problem of night-time noise include its occurrence in residential areas with low background noise levels, combinations of noise and vibration such as that produced by trains and heavy duty vehicles, and sources with low-frequency components which are more disturbing, even at very low sound pressure levels. These low-frequency components have a significant detrimental effect on health.

Cardiovascular and Physiological Effects

Epidemiological and laboratory studies demonstrate that noise has both temporary and permanent effects on human physiology. It has been postulated that noise acts as an environmental stressor. Acute noise exposure activates the autonomic and hormonal systems leading to temporary increased blood pressure, increased heart rate, and vasoconstriction. After prolonged occupational noise exposure, susceptible individuals may develop permanent effects such as hypertension and ischemic heart disease. Sudden unexpected sounds evoke reflex responses as well.

If the noise exposure is temporary, the physiologic systems return to normal. If the exposure is of sufficient intensity and unpredictability, cardiovascular and hormonal effects may appear; these include increased heart rate and peripheral resistance; changes in blood pressure, blood viscosity and blood lipids; shifts in electrolytes, especially calcium and magnesium, and increased levels of epinephrine,

norepinephrine and cortisol. These effects are of interest because of noise related coronary artery disease. There is a growing body of evidence that suggests noise may be a risk factor for cardiovascular disease. Workers exposed to high levels of industrial noise have increased blood pressure and statistically significant increases in risk for hypertension compared to workers in control areas. Few studies have been done on the effects of environmental noise; those that have been done found a weak association between long-term noise exposure and either ischemic heart disease and hypertension

Nevertheless, these small increases in risk may be important because of the large numbers of persons who are currently exposed to these noise levels and the increasingly large numbers who are likely to be exposed in the future. Only average risk has been considered; there may be highly sensitive subgroups in the population that have not been characterized or studied. A small increase in risk to the general population may be, in these groups, a clinically significant increase.

The effects of noise on immunologic function and on gastrointestinal disturbances have also been subjects of limited evaluation.

Effects on Mental Health

Mental health is defined as the absence of identifiable psychiatric disorders according to current norms. Environmental noise is not believed to be a cause of mental illness, but it is assumed to accelerate and intensify the development of latent mental disorders. The adverse effects of environmental noise on mental health include the following catalog of complaints; anxiety, emotional stress, nervous complaints, nausea, headache, instability, argumentativeness, sexual impotency, changes in mood, increase in social conflicts as well as neurosis, hysteria, and psychosis. Population studies have suggested associations between noise exposure and mental health indicators such as rating of well-being, symptom profiles, use of psychoactive drugs and sleeping pills, and mental hospital admission rates. There may be great differences in the ability of various populations to cope with noise pollution; particularly vulnerable groups may include, children, the elderly, and those with preexisting disease, especially depression.

Effects on Performance

The adverse effects of occupational and environmental noise on performance of cognitive tasks are well established. Field studies showed that noise produces task impairment and increases the number of errors in work. Among the cognitive effects, reading attention, problem solving, and memory are most strongly affected by noise. The observed noise-induced decrease in motivation as measured by persistence with a difficult cognitive task may either independent or secondary to cognitive impairments. Two types of memory deficits have been identified under experimental conditions; both are adversely influenced by noise exposure.

Experimental noise exposure consistently produces negative after-effects on performance. This is particularly true in children in whom the negative effects are intensified. It appears that the longer the exposure, the greater the damage. Thus, schools and daycare centers should be located in areas that are relatively noise-free. Children from noisier areas have been found to have heightened sympathetic arousal, indicated by increased levels of stress hormones and elevated resting blood pressure.

Effects on Social Behavior and Annoyance

Noise annoyance is a global problem. The definition of annoyance is a feeling of displeasure associated with any agent or condition, known or believed by an individual or group to adversely affect them. Apart from annoyance, people may feel a variety of negative emotions when exposed to community noise, and may report anger, disappointment, dissatisfaction, withdrawal, helplessness, depression, anxiety,

distraction, agitation, or exhaustion. Thus, the term annoyance, while widely used, does not begin to cover the range of negative reactions associated with noise pollution.

Noise can produce a number of social and behavioral effects apart from annoyance. The social and behavioral effects are often complex, subtle, and indirect. Social and behavioral effects include changes in everyday behavior (e.g., closing windows, not using balconies, turning television and radio sets to louder levels, writing petitions, complaining to authorities): changes in social behavior (e.g., aggressiveness, unfriendliness, disengagement, nonparticipation); changes in social indicators (e.g., residential mobility, hospital admissions, drug consumption, accident rates); and changes in mood (e.g., reporting being more depressed or less happy).

Noise exposure, per se, is not believed to produce aggressive behavior. However, in combination with provocation, preexisting anger or hostility, it may trigger aggression. It is also suspected that people are less willing to help others, both during and after a brief period of exposure to noise. Noise above 80 dB is consistently associated with reduced helping behavior and increased aggressive behavior. There is concern that high levels and continuous environmental noise may contribute to feelings of helplessness in schoolchildren.

Studies have shown that equal levels of different kinds of noise result in different magnitudes of annoyance. Some of this difference may be related to the time of day at which the noise occurs, the duration and intensity of the noise, and the nature of the activity which is interrupted.

Annoyance in populations varies not only with the acoustical characteristics of the noise, but also with many non-acoustical factors of social, psychological, or economic nature. These include fear associated with the noise source, conviction that noise could be reduced by third parties, individual noise sensitivity, the degree to which an individual feels able to control noise, and whether or not the noise originates from an important economic activity. Demographic variables such as age, sex, and socioeconomic status are less strongly associated with annoyance. The correlation with annoyance is much higher at the group level than at the individual level.

Greater annoyance has been observed when noise is accompanied by vibrations that contain low-frequency components or when the noise contains impulses such as the noise of gun shots. Annoyance is also greater when noise progressively increases over time rather than remaining constant.

Effects of Combined Noise Sources

Most environments consist of a mixture of sounds from more than one source. For these, health effects are associated with the total noise exposure rather than with the noise from any single source. In cases where one noise source clearly dominates, the magnitude of an effect may be assessed by taking into account the dominant source only. There is no consensus on a model for measuring the total annoyance due to combination of environmental noise sources. Not enough is known to assess the potential additive or synergistic effects of noise combined with other environmental agents such as vibration or ototoxic agents.

The evidence related to low-frequency noise is sufficiently strong to warrant immediate concern. Various industrial sources emit continuous low frequency noise (such as diesel engines) and intermittent low-frequency noise (such as railway traffic). Low frequency noise is associated with vibrations and rattles as secondary effects. Adverse health effects due to low-frequency noise are estimated to be more severe than for community noises in general. These noises are generally underestimated with the usual types of sound measurement.

In residential populations, noise pollution will be associated with a combination of health effects, such as cardiovascular disease, annoyance, interference at work and at home, and sleep disturbances, among others.

Vulnerable Groups

Protective standards are derived from observations on the health effects of noise on "normal" or "average" populations. People who are elderly, ill, or depressed are not usually included in study populations; as a general rule, neither are infants or young children. These groups may be less able to cope with the impacts of noise exposure and may be at greater risk for harmful effects. Vulnerable groups, generally underrepresented in study populations for a variety of reasons, include people with various diseases (e.g., hypertension); people in hospitals or those rehabilitating from disease or injury; people dealing with complex cognitive tasks; the blind, the hearing impaired; fetuses, babies, and young children; and the elderly.

Persons with impaired hearing are obviously the most adversely affected by noise, especially with respect to speech perception. Their problems are compounded in noisy environments.

Children have been identified as particularly vulnerable to noise exposure. The evidence on the effects of noise pollution on children's health is strong enough to warrant monitoring programs in schools and elsewhere to protect children from the effects of noise.

The issue of vulnerable subgroups in the population should be considered when developing regulations or recommendations for the management of community noise.

Such management should take into account the environment (home, school, public place), the types of effects (recreation, annoyance), and specific lifestyles (headphones, concerts, motor cycling).

WHO Guidelines

Based on the known health effects, guidelines for community noise should address the following: annoyance, speech intelligibility, disturbed concentration, sleep disturbance, and hearing impairment.

Because health effects are relevant to specific environments, specific guideline values have been proposed for the following: dwellings, including bedrooms; schools and preschools; hospitals; industrial, commercial, shopping, and traffic areas; ceremonies, festivals, and entertainment events; use of headphones for music and other sounds; impulse sounds from toys, fireworks, and firearms; and outdoors in parklands and conservation area.

Trends in Noise Pollution

A number of trends are expected to increase environmental noise pollution in the future. The following factors are considered to be of importance: the expanding use of increasingly powerful sources of noise; the wider geographic dispersion of noise sources along with greater individual mobility; and increased invasion of noise, especially in the early mornings, evenings, and weekends.

Conclusions and Recommendations

The potential health effects of community noise include hearing impairment, startle and defense reactions, aural pain, speech interference, sleep disturbance, cardiovascular effects, performance reduction, and annoyance responses. These health effects can lead, in turn, to social handicaps, reduced productivity,

decreased performance in learning, absenteeism, increased drug use, and accidents. Another significant effect, unrelated to health, is loss of property value. The aim of governmental controls should be to protect the population from these adverse effects of noise.

Dr. Louis Hagler may be contacted at Louishagler@aol.com.

VEGETATION / HERBICIDES

Vegetation:

Since trains travel across the United States and Canada by nature of design locomotives and rail cars pick up plants, seeds and animals that get near tracks. They wind up underneath the locomotive and the rail cars. More than once I have had to pull pieces of dead cattle out from on top of fraction motors, tumbleweeds entangled in road gear, all sorts of plants caught on the bottom of a locomotive. These items become dislodged as they degrade and fall off in different parts of the country where they are not originally from. This will pose a new hazard for the farmer. Possibilities of diseased livestock and introduction of non-regional plants.
Impact on plants – crops will be bad. Smaller plants – less yield per acre.
Impact on livestock – cows wont' milk, chickens won't lay eggs, cattle will be sick and under normal weight.

Our food source will be permanently damaged beyond repair.

Millions of people will be affected as we do not consume everything we grow. Once people know what is in our food products, they won't buy them. No one wants contaminated foods. Our livelihoods will disappear. This will mean foreclosures of properties. Economic devastation for the area.

Herbicides:

Railroads use and hire companies that use chemicals to kill vegetation at tracks and right-of-way locations. These are herbicides the general public cannot even buy. Plants become resistant so more and stronger chemicals are needed. Application of chemicals can be from rail equipment, trucks on right-of-ways or helicopters and aircraft. Considering the amount of rail traffic (a train every 13 minutes), track machinery won't be an option. Aircraft is most likely going to be the most cost effective choice. Spraying is conducted in March and April then again in June and July to fight hard to kill species. Wind will also carry these chemicals onto our crops and fields and homesteads. This will kill many of our plants and poison animals and water. There is no way to stop the damage done to non target areas. All of this means severe eco damage and financial loss to me and my community.

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<< Rail News Home: Maintenance Of Way

2/7/2008

Rail News: Maintenance Of Way

Vegetation management: Railroads are pulling out all the stops

Weeds and overgrown trees are more than an eyesore or inconvenience. For railroads, they're a safety and operational issue. Uncontrolled vegetation can reduce visibility for operators, pose a fire hazard or come in contact with overhead catenary lines, causing passenger-train delays.

To keep vegetation growth in check, railroads have programs in place that aim to proactively eradicate weeds before they grow, kill those that already have sprouted, and control tree and bush growth. And they rely on a combination of herbicide spraying and mechanical brush cutting to do it.

"It's a very unglamorous subject, yet it's one of the most important when it comes to the foundation of the railroad," says Mike Armstrong, general director, maintenance planning for BNSF Railway Co. "Most people find it boring and don't want to talk about it. It doesn't get the limelight and attention."

Maintenance-of-way managers are trying to give it the attention it deserves, both to keep trains moving and prevent accidents.

"We have a complete program to keep our lands clear of trees and vegetation to continue to maintain service and security," says John Pielli, senior director of track maintenance and compliance for Amtrak, which spends about $2.2 million annually on its program. "Our engineers need to have a good, clear line of sight, particularly in areas where we're operating at speeds up to 150 mph."

Weed spraying is a key element of Amtrak's program.

Contractors spray a pre-emergent herbicide on and off track between the third week of March and end of April, as well as a post-emergent herbicide beginning June 1 to eradicate pesky plants that weren't killed off by the pre-emergent application.

The national intercity passenger railroad contracts Railroad Weed Control Inc. (RWC) to spray east of the Mississippi River; Amtrak's currently in the process of obtaining a new contractor to spray areas west of the Mississippi.

Contractors treat more than 6,000 acres with a pre-emergent

application and 1,000 acres with post-emergent herbicides on track; 2,000 acres with a pre-emergent and 1,000 acres with a post-emergent off track; and 5,000 acres with a brush spray application. In addition, herbicides are applied at about 85 electrical traction power substations and 100 signal boxes annually.

A Tight squeeze

Freight railroads control vegetation on tracks Amtrak uses but doesn't own. Amtrak controls vegetation along its own rights of way, primarily in the Northeast Corridor, where close quarters pose challenges.

For example, between Philadelphia and Harrisburg, Pa., and Washington, D.C., people living along Amtrak's right of way have planted bamboo to filter noise.

"[Bamboo] is a fast-growing, invasive species that gets into the track bed real quick, so we spot spray for that," says Pielli. "We've also had great success with spraying rock slopes with herbicides that only kill woody plants."

Contractors have to meet Amtrak's detailed specifications to ensure they spray within designated areas and don't impinge on neighboring properties. Amtrak also requires contractors to have drain trays on the bottom of their nozzles to catch any run-off after the sprayer is turned off. Otherwise, a contractor driving over an open-deck bridge could spray run-off into the water below.

Chemical reaction

Herbicide applications are a key component of most other railroads' vegetation management programs, as well.

Commuter-rail agencies MTA Metro-North Railroad and Metrolink also apply pre- and post-emergent herbicides. Metro-North contracts RWC and Metrolink, Paul Washburn, to spray their rights of way.

Both railroads spray almost every track mile with a pre-emergent herbicide, then spot spray with post-emergent chemicals on an as-needed basis. For example, Metrolink workers recently found horsetail growing along the railroad's right of way in southern California — the weed hasn't appeared in more than a decade, says Dale Stuart, system bridge maintenance manager.

The railroads leave it up to their respective contractors to determine which herbicides will best control weeds. Herbicides change annually because weeds become resistant to certain chemicals over time, says Stephen Cole, Metro-North's assistant director of materials.

Freight railroads also incorporate herbicide sprays into their vegetation management programs. For Montana Rail Link (MRL), contractor Asplundh Tree Expert Co. each spring sprays a sterilant within 12 feet of either side of the track along 1,100 track miles, including yard tracks, says MRL Chief Engineer Richard Keller.

Once the sterilant is applied, Asplundh targets hard-to-control weeds, such as kochia and equisetum, that have grown outside the 24-foot area. The "extra-wide" spraying operations occur twice a year — once in May or June, and again in August or September.

In addition, MRL conducts a noxious weed program throughout the summer to target problem areas where thistles or knapweed have sprouted along the right of way.

"If you're not aggressive, these things spread very quickly and become a problem," says Keller.

Weather Watchers

CSX Transportation's engineering department tries to aggressively combat weeds, too. Engineering managers constantly gauge the weather to determine the best times to spray, says Manager of Engineering Programs Kelly Goedde.

"If you spray too soon and the rains come late in the spring, a lot of the herbicides have effectively run their half-life, so you don't get the maximum efficacy out of them," he says. "If you think it might be a late spring and the rains come early, then you can't get out there to spray and the weeds get a head start on you."

The Class I sprays herbicides in areas covering about 43,000 miles, or 131,000 acres, annually. CSXT's contractor determines which herbicides to use.

"There are new formulations of the old products, and other new products are always trickling in," says Goedde. "We're finding out what the best use for those herbicides are in our system."

There will always be a demand for new chemicals to control herbicide-resistant weeds, says BNSF Railway Co. Manager

of Vegetation Control Gary Nyberg.

"We include herbicide rotation as part of the program to help break up the cycle of resistance, but additional products are needed," he says. "We now know of several weed species that are resistant to glyphosate, which is a recent development."

BNSF applies herbicides on 32,000 route miles, or 50,000 operated miles, annually. The Class I divides its system into territories and contracts spraying to five companies: RWC, Right-a-Way Applicators, Rumble Spray Inc., Dakota Helicopters and Asplundh Canada.
Where possible, BNSF uses a combination of chemical spraying and mechanical cutting to control vegetation.

"Mechanical cutting alone stimulates re-growth, but by treating the cut stumps and stubble when they're cut, we can prevent suckering and resprouting," says Nyberg.

The two-fisted technique enables BNSF to maximize maintenance dollars and track time, and extend brush-cutting cycles by five years or more, Nyberg says, adding that there's an industry need for equipment that can apply herbicides during the cutting process.
Brush cutting remains an equally important part of other railroads' vegetation management programs.

CSXT focuses brush-cutting operations mostly at crossings to increase visibility for motorists. The Class I cuts brush along 2,200 to 3,000 miles annually, both on a contract basis and with its own crews.

"It depends on timing, where you're cutting, how busy the line is and the number of machines available," says CSXT's Goedde.

The Class I plans to purchase brush-cutting equipment for its workers.

The railroad is considering a machine with two heads — a high-production head designed to cut off whole limbs up to six inches in diameter and a flail head for mulching. The heads can only operate one at a time, but having both options available at once would help improve CSXT's brush-cutting efficiency.

"With this variable head, we can switch between the two depending on the application," says Goedde.

Trouble overhead

For Amtrak, brush cutting is particularly important along the electrified Northeast Corridor, where overgrown trees pose problems for the overhead catenary system.

"If those trees get too close or into the high-tension wires, we get a pause in the electricity and it brings trains to a stop," says Amtrak's Pielli.

The railroad contracts KW Reese Co. to perform planned brush cuts and Asplundh to do emergency cutting. Amtrak also has several in-house tree-trimming crews based in the Northeast Corridor. Two of the crews regularly trim trees using a mechanical tree cutter mounted on a hi-rail vehicle. The unit features a specially designed cutter head that can maneuver under, over and around the overhead catenary system.

Battling Mother Nature

Keeping up with overgrowing brush is key to Metrolink, which operates in a dry and windy climate at high risk for fires. The agency constantly inspects its right of way, especially before the fire season and Santa Ana rains, says Metrolink Right of Way Maintenance Coordinator Elsa Mendoza. Metrolink contracts Herzog Contracting Corp. for brush cutting services.

"We can't have things blowing on tracks," says Mendoza. "We need to make sure trees don't become an operational issue for us."

Meanwhile, Metro-North cuts brush on a cyclical basis.

"We don't do every line every year. We might cut one line or one branch [line]," says Metro-North's Cole. "We try not to let one line go too long [and] we'll follow up within two years."

The agency currently is focusing brush-cutting efforts on the Port Jervis Line with contractor Asplundh.

Vegetation management continues to be essential to maintenance-of-way programs, and railroads, for the most part, have the techniques down pat. Dealing with Mother Nature is becoming, well, second nature.

"It's something we've been dealing with for ages," says Montana Rail Link's Keller.

Western Railroad Discussion > What do the railroads use for weeds and small trees

Date: 08/15/07 11:51
What do the railroads use for weeds and small trees
Author: uprrfan

I was wondering what the railroads are using to kill the grass/weeds and small trees along the right of way. On our farm, Roundup wouldn't work fast enough or knock down some small trees. We switched to 4# of 2,4-D, however it was a restricted use herbicide, hard on the body, but worked effectively. I've also seen some MOW gangs use a power reel which would just chew up vegetation along the way.

[Reply To This Message] [Quote]

Date: 08/15/07 12:36
Re: What do the railroads use for weeds and small trees
Author: hepkema

Most railroads out west (Class 1 and shortline) use contract spraying services. Whatever it is that they use, don't be parked too close to the tracks when they come by. You might think that you have had your vehicle spraypainted white. Nasty stuff, whatever it is. I have seen guys in full protective suits doing the spraying. Probably best to move to another spot for the day--maybe another line.

[Reply To This Message] [Quote]

Date: 08/15/07 12:49
Re: What do the railroads use for weeds and small trees
Author: Lone Star

Hyvar and Hyvar X-L from Dupont have been used, as well as appropriately named Spike from Dow. In high concentrations, any of these are merciless in perennial weed/brush control scenarios.

John

[Reply To This Message] [Quote]

Date: 08/15/07 12:53
Re: What do the railroads use for weeds and small trees
Author: wa4umr

Interesting photo at http://www.railpictures.net/viewphoto.php?id=110749&nseq=0

I saw one like this on NS about 2 years ago http://abpr2.railfan.net/abprphoto.cgi?august06/08-17-06/CSX_Jun_06_Weed_Sprayer_Greenwich_OH_006.jpg

I don't know what they spray but I suspect it's something that requires you to be licensed to handle.

John

[Reply To This Message] [Quote]

Date: 08/15/07 14:24
Re: What do the railroads use for weeds and small trees
Author: CShaveRR

Funny this should come up today.

Our railroad has a contractor come in and spray our yard every spring. They list all of the chemicals, and tell you where you can obtain the pertinent information about them (probably too much to put into the bulletin).

But, they aren't effective. Just today, we had a local contractor come in with weed whackers and plastic bags to cut down what's grown since the spring. I know that some of the tough stems on these weeds set one of the machines to smoking!

[Reply To This Message] [Quote]

Date: 08/15/07 16:29
Re: What do the railroads use for weeds and small trees
Author: sn_row

For grasses -- Round Up Ultra and for for small trees or any hard to rid weeds or berry vines --- Garlon 4 or Garlon 3A works just fine. Ned to target plants when grasses are usually under 1 foot high and hot wait till they are 3-4 feet tall as the spray kills better when the plants are younger. Must be a Department of Pesticide Regulation card holder for your state and county you spray in. If you use Pre M for pre growth then there are several chemicals you can use but depending on the county and state it is recommended you have a PCA to decide what to use. RoundUp and Garlon combined knocks the weeds out fast and burns for quite some time and is usually very effective if the grass weeds are young. Usually depending how heavy the growth is but normally 2 applications per season works just fine. Garlon will knock out any hard to kill plant or small trees under 6 inches thick plus any branches or leaves the spray touches when spraying.
SN

[Reply To This Message] [Quote]

Date: 08/15/07 19:03
Re: What do the railroads use for weeds and small trees
Author: st2k

This is a quote from a Guy on one of the speeder sites, I think he does the weed control for a museum line:-

"Monsanto who makes roundup also make a generic one too. I buy it in bulk at the co-op for about 18 dollars a gallon. Also you want to put 2% of princep and 1% 2.4.D and .5% of ammonia sulfate, and a surfatant in there. I can spray about 30 miles of right-of-way for about $350.00. The above mix will not only kill all plants that are growing, but the future ones too. This should last a good 6 months too."

ST2-K

[Reply To This Message] [Quote]

Date: 08/15/07 20:29
Re: What do the railroads use for weeds and small trees
Author: InsideObserver

Chainsaw liposuction.

[Reply To This Message] [Quote]

Date: 08/15/07 21:48
Re: What do the railroads use for weeds and small trees
Author: trkinsptr

We use Garlon 4,Pro-Roundup and Hasten spray adjuvant in our 50 gallon sprayer for spot spraying around the yard. Once a year we bring in a contract sprayer to spray the yard. It can do 3 yard tracks at a time but I believe 1 track at a time gives better coverage.
Colin Johnson

[Reply To This Message] [Quote]

Date: 08/16/07 09:19
Re: What do the railroads use for weeds and small trees
Author: WW

Some railroads haved used Ureabor, a very strong and long-lasting ground defoliant, to more or less "permanently" treat areas where vegetation needed to be removed. Ureabor is a soil sterilant and can last years. It must be applied very carefully and must not get into water drainages.

[Reply To This Message] [Quote]

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SAFETY

Railroad accident statistics:
F.R.A. reports (information submitted by railroads) that in the U.S. per year there is an average of 3,000 train accidents which result in property damage, injury and death. Every three days a train derails.

The railroads that will use the proposed GLBT line are BNSF-CSX-CN-CP-NS-UP.
NTSB statistics show these railroads have had accidents of derails, hazardous material releases, collisions, rear-ends, head-ons (locomotive to locomotive)-fires and fatalities of at least 144 times in recent years. One was radioactive leak where a vessel had failed. These are the same railroads that are to run less than one mile from my home and from schools in the area where our children and grandchildren attend.

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You are here: Home / FAQ / What are U.S. railroad accident statistics?

What are U.S. railroad accident statistics?

- According to the Federal Railroad Administration, in an average year in the United States, more than 3,000 train accidents occur leading to death, injury and property damage.
- National statistics show that every two hours there is a train accident in the USA. Almost all of these accidents involve some type of property damage—and in some cases injury and death.
- Almost all train accident claims and lawsuits are subject to a host of varying laws and legal standards, often involving several parties pointing the finger at overall responsibility.
- Half of all railroad accidents occur at crossings that are inadequately protected. According to the Federal Railroad Administration, more than 80% of railroad crossings don't have sufficient warning signals and devices.

Filed under FAQ · Tagged with Accident Claims, Accident Statistics, Federal Railroad Administration, Lawsuits, National Statistics, Pointing The Finger, Railroad Accident, Railroad Accidents, Railroad Crossings, Signals, Train Accident, Train Accidents, United States

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FATAL	III	II	" " 7	II		
FIRE	II	I	I " " 4			

ONE WAS RADIOACTIVE LEAK

STATS NTSB 96 - 16

FIRE HAZARDS

Volunteer and local fire departments will not be able to combat potential fires, as they do not have the equipment needed and cannot afford to buy what will be needed for such fires. Preferred methods for rail fires are foam products. Trains also do not carry firefighting equipment.

Sources of Fires:
Fuel tanks on locomotives hold an average 5,000 gallons of fuel. In the event of a derail or accident there is a great possibility of a rupture and fire. Other sources include embers and sparks from exhaust. Sparks and hot metal chips from wheel and track. Also brake shoes and bearings. Electric moor failure and traction motor leads. Borate nitrate from the coolant system once it dries becomes a fire hazard, it is an oxidizer. Dry borate on dry grass is ignited by friction.

Railroad ties – Creosote soaked wood. Old ties dry and splinter easily and catch fire.

Some locations of fires will not be accessible with conventional equipment (fire trucks are not off road equipment).

Due to winds and accessibility, field fires will be uncontrollable, large parcels of land will be lost.

Buildings and homes and schools will be jeopardized.

When Railroad employees describe locomotive fires, words like spectacular are often used.

Engineers on trains will not report fires because they won't see them. They are looking forward and are gone before fires reach dangerous levels.

According to the news, F.R.A reports, and NTSB there have been 58 lives lost from trains catching on fire or trains creating fires in two incidents, one in Canada (47 lives and 1 town lost), the second in Illinois (11 lives lost). This is just two accidents resulting in fires from trains.

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Thread: Why do modern trains start fires?

08-15-2010, 08:00 PM #1

dwkarch
Senior Member

Join Date: Sep 200
Location: Bailey, Colorad
Posts: 1,18

Why do modern trains start fires?

What causes modern diesel trains to throw sparks that start fires along the track? I once watched one start and stomped it out.

Don Karch Cripple Creek Railroads Route (CS&CCD, MT, F&CC)
Rollins Pass/Moffat Tunnel Route V5 (Denver to Craig and Glenwood Springs)
D&RGW Glenwood Spgs-Grand Jct Route and Colorado Joint Line, Denver-Pueblo
C&S Narrow Gauge South Park Line (with D&RG NG and Colorado Midland SG)

08-15-2010, 08:48 PM #2

grundge69
Senior Member

Join Date: Aug 200
Location: Wichita, Kansas, USA
Posts: 52

I fought this at the beginning of the summer...it would be 100°F out and we're pulling up the steepest hill on our route, 60 loaded hoppers in tow, 2 GP40 turbocharged units, and as far as we could figure out, it would either be sparks from the exhaust (which is actually pretty neat to see on a clear winter's night), slipping traction motors trying to grab some rail, or that in combination with dead vegetation that had recently been sprayed/killed catching fire.

I would come home after all is said and done, take off my shoes, and you could see a black ring around where my shoes stopped. Farther up, you could see in contrast to where my socks stopped and my skin started by how dark my skin was. Same with my shirt. I eventually requested two fire extinguishers from the company. So I could be better prepared when this would happen. My switch broom wasn't up to the task and my boots weren't getting any better.
Codeman

Reply With Quote

08-15-2010, 09:14 PM #3

derekmorton
Senior Member

Join Date: Nov 199
Location: Eltham, Australia
Posts: 6,05

The exhaust system can get deposits of carbon and oil that stick to the sides of the pipes when units are run at low revs.
When the units are run at full throttle for an extended period, the deposits can get dislodged and get fired out of the exhaust in the manner you have seen.

Derek

Cheers
Derek

Reply With Quote

08-15-2010, 09:38 PM #4

PORU333
Member

Join Date: Jul 200
Posts: 10,80

Up here on the Rumford Branch of the Pan Am Railways, it often happens due to the engines being placed into a high notch (normally 6-8) as mentioned, which will sometimes kick out some hot coal (sparks) into the air and they can land on dead grass, or anything really dry from the summer heat and little rain.

Reply With Quote

08-16-2010, 03:11 PM #5

madoke
Senior Member

Join Date: Oct 200
Location: Spokane, Washington, USA
Posts: 86

Hmmm. Spark arresters have been around for quite a long time, on chain saws, mowers, tractors, ATV's, construction equipment, diesel and gas trucks, steam engines, etc.. In fact they are required by law in most states. I wonder why they haven't been installed on diesel train engines. Do they have a special exemption?

Doug

Reply With Quote

08-18-2010, 12:09 AM #6

Andy J
Senior Member

Join Date: Aug 200
Location: Austinville, Virginia, USA
Posts: 2,82

Most of these units, are well worn... As they sit and idle for hours on end, small amounts of oil leaks by turbocharger and valve seals, also, you get chunks of carbon that break loose from valves and piston tops...

When the throttles of these units are opened wide, all that accumulated "crude" which is very hot by this point, gets blown out of the stacks.

Then you can have sparks thrown from brake shoes, or bits of hot steel spalling off of the rail, or wheel, those are another source of line side fires.

You can have arcing from traction motors, but that will typically be a short lived thing, as they burn themselves up.

Locomotives can "throw a rod" and when that hot oil hits the fresh air coming in the new "window" it can, and does burst into flames.

A certain type of Turbo used on GE locomotives (all others can too, to a MUCH lesser extent) a while back had a bunch of "catastrophic failures" literally the turbos would suddenly "explode" at high load and the hot, high pressure oil, used to lube the bearings in the turbo {before they escaped} would get sprayed all over the hot exhaust of the locomotive, and they you have a HECK of a engine fire..NS, among several other class 1's took hundreds of units out of service, till the problem was solved

Dynamic brake grids, can fail in SPECTACULAR FASHION.

Wheel bearings can fail, and cause a fire...Spectacularly... The old style plain bearings, would actually catch the journal oil on fire...and drip flaming oil for miles out of the box onto the ROW....The crew in cabooses in the old days where alert to the smell of "hot boxes"

Also when a train with plain bearings that had a "hot box" would stop to cool the journals, sometimes, when the lid on the journal was raised to add fresh sticks of oil, the old hot oil would burst into flames as the air hit it. It somtimes got on the crewman, and caused a nasty burn, as the flaming oil STUCK to anything it touched.

Also in the old days, because of steam engines, and the use of plain bearings, the ROW was kept neatly manicured, and the brush kept way back....The railroads DO NOT, keep their lines that neat anymore...adding to the risk of fire. And as pointed out when they do spray..that leaves lots of tinder, track side.

Another thing is that creosoted cross-ties, when they are old, can smolder for DAYS after a hot spark lands on it, than at 2 AM several days later, can burst into flames... Case in point, the Lobato Bridge burning a while back on the C&TS near Chama.

I don't think the new style, composite brake-shoes are as bad to spark as the older cast iron ones where, but it is still a friction material, and they and the steel wheel, will get very hot.

Does this help?

Last edited by Andy J; 08-18-2010 at 12:24 AM.

http://intrepidappalachian.blogspot.com/

The boost is high, and I am flying low...Thunderbird Turbo Coupe

Reply With Quote

08-18-2010, 04:43 AM #7

Erick_Cantu
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Join Date: Jun 2004
Location: St. Cloud, Minnesota, United States of Anarchy
Posts: 3,319

> Originally Posted by **Andy J**
> *Dynamic brake grids, can fail in SPECTACULAR FASHION.*

So can their fan hubs.

Andy J
Senior Member

http://youtu.be/YQAGWo3PbZk

January 23, 2008: NS 963, light engines, the 6th unit NS 6199 catches fire when the traction motor / armature fails and the roller bearing seizes. The 4th axle is burning away the traction motor, which causes a lot of sparks and flames to fly. Ties caught on fire, however smoldered out within a few minutes. Burnt shoes could be smelled over a half-hour period after the pass-by of the train. 963 consist of NS GP60 7125, NS Dash-9-40CW, NS Dash-8-40C, NS Dash-9-40C, NS RPU-6 864 Slug mated to NS SD40-2 6199. Obviously, I called this in and the train stopped short of CP Prescott after passing over the 79.9 detector announcing 'no defects' - 963 was moving within 45 minutes. Taken in Richland. Enjoy the fireworks!

Last edited by Andy J; 08-18-2010 at 08:08 PM.

http://intrepidappalachian.blogspot.com/

The boost is high, and I am flying low...Thunderbird Turbo Coupe

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ENVIRONMENT/IMPACT

Of all the studies done on trains and transportation, one solid fact continues to be repeated over and over.....the direct and indirect cumulative effects are always found to have a negative impact on ecology and society as a whole.

It has also been found that those who cause these problems do not take responsibility for the problems which ultimately means there will be no financial help to resolve any negative issues leaving damages to be dealt with by local communities that never shared in any profit from any business done in their community. Once the food and water resources are tainted or ruined the destruction is permanent.

Consideration also must be given that there will be thousands and thousands of CREOSOTED cross ties used which will leach chemicals into soils, waterways and wells.

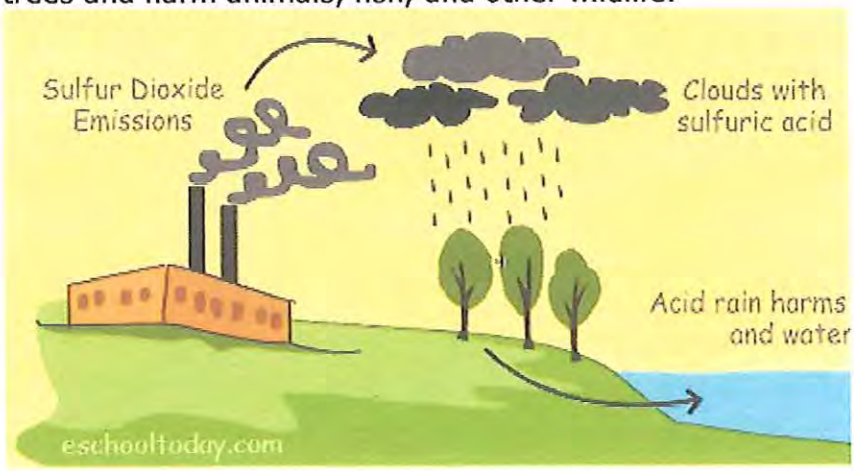
What is Air Pollution
Causes of Air Pollution
Common Air Pollutants
Effects of Air Pollution
Prevention / Solutions
Indoor Air Pollution
Fact Sheet

What are the effects of air pollution?

Below are a few key effects of air pollution. The last page on has some specific air pollution incidents that are worth checl

Acidification:

Chemical reactions involving air pollutants can create acidic compounds which can cause harm to vegetation and buildinç Sometimes, when an air pollutant, such as sulfuric acid coml the water droplets that make up clouds, the water droplets t acidic, forming acid rain. When acid rain falls over an area, i trees and harm animals, fish, and other wildlife.



Acid rain destroys the leaves of plants.
When acid rain infiltrates into soils, it changes the chemistry making it unfit for many living things that depend on the soil habitat or for nutrition. Acid rain also changes the chemistry lakes and streams that the rainwater flows into, harming fisl aquatic life.

Eutrophication:

Rain can carry and deposit the Nitrogen in some pollutants c and soils. This will adversely affect the nutrients in the soil a bodies. This can result in algae growth in lakes and water bc make conditions for other living organism harmful.

Ground-level ozone:

Chemical reactions involving air pollutants create a poisonou ozone (O3). Gas Ozone can affect people's health and can d vegetation types and some animal life too.

Particulate matter:

Air pollutants can be in the form of particulate matter which very harmful to our health. The level of effect usually depen length of time of exposure, as well the kind and concentratic chemicals and particles exposed to. ***Short-term effects*** incl irritation to the eyes, nose and throat, and upper respirator such as bronchitis and pneumonia. Others include headache and allergic reactions. Short-term air pollution can aggravat medical conditions of individuals with asthma and emphysen

NOTES

- *Particulate matter can come in almost any shape or size, and can be solid particles or very very tiny liquid droplets.*
- *Big particles can be between 2.5 and 10 micrometers (about 25 to 100 times thinner than a human hair).*
- *Small particles are smaller than 2.5 micrometers (100 times thinner than a human hair).*

See more related lessons here

Ocean Acidification
Genetic Modification
Global Water Scarcity
Climate Change
Forest Preservation
Waste Management

DieselNet Technology Guide

Health and Environmental Effects

Abstract: Diesel emissions include a number of biologically active substances. In this group, diesel particulates and the associated organic phase became a major health concern. From the environmental perspective, the advantages of diesels are low "greenhouse gas" and hydrocarbons emissions; their drawback is high NOx emission.

1. Toxic Compounds in Diesel Exhaust

The principal toxic gas compounds found in diesel exhaust include carbon monoxide (CO), nitric oxide (NO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2). Biological activity and toxic characteristics of these compounds have been studied for years and are relatively well understood.

In recent years, emission of diesel particulate matter (PM or DPM) has become one of the major health concerns among all diesel emissions. Medical research on health effects of PM is still in the initial phase of exploring this new area of human knowledge. There are many controversial opinions and many questions have not been answered, awaiting the results of ongoing and future studies. These uncertainties as to the effects of PM and its components are also reflected in the lack of a precise, universal definition of diesel particulates. While practically all of the public health/engine emission regulations define PM as a mix of solids, organics, and sulfates, such definitions as total carbon (i.e., excluding sulfates), or elemental carbon (i.e., excluding sulfates and organics) have been proposed and/or implemented by various occupational health regulations.

Diesel emissions contain numerous other compounds that are present in diesel emissions in smaller quantities, but still may be posing health threat to humans. The most important substances in this group include polynuclear aromatic hydrocarbons (PAH), nitro-PAHs, aldehydes, and selected other

hydrocarbons and their derivatives. In their pure state, several of these species have been classified as human carcinogens (e.g., benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, indeno[1,2,3-c,d]pyrene). Even though their concentrations in diesel exhaust are orders of magnitude lower in comparison to the principal diesel pollutants, they are still seen as a potential serious health hazard. In the USA, the Environmental Protection Agency (EPA) included "polycyclic organic matter" (POM) in the list of urban hazardous air pollutants (HAP) [EPA 1999]. The POM, defined as compounds with more than one benzene ring and a boiling point of 100°C and higher, includes practically all of the diesel PAH material.

Most of the heavy organic compounds, such as PAHs, are found in the particulate phase of diesel emissions. This association, in combination with their very low concentrations, makes it rather difficult to differentiate between the health effects of the solid DPM fraction and the particular organic species. A common approach is to study the effects of DPM as a whole. Diesel particulates, including both the solid and organic phase, have been identified as a toxic air contaminant in California [CARB 1998].

Some health studies take an even more simplistic approach, investigating the effects of "whole diesel exhaust", which includes both gaseous pollutants and particulates. Diesel particulates are frequently used in these studies as an indicator of the diesel exhaust exposure, but no effort is made to analyze which components of the exhaust gases are responsible for particular health effects. From the perspective of diesel emission control, this approach is not practical. Blaming the entire diesel exhaust for adverse health effects is not useful in setting emission control targets or selecting suitable control technologies. After all, the diesel exhaust gas is composed in over 99% of non-toxic materials, including nitrogen, oxygen, water vapor, and carbon dioxide. A consensus in newer publications is that the particulate phase in diesel exhaust, including solid inorganic carbon and the associated organic material, has the greatest effect on health [WHO 1996].

Major diesel emission components that have adverse health or environmental effects are listed in Table 1 [HEI 1995]. A summary of the possible biological impacts and atmospheric reaction products (secondary pollutants) are also provided. This summary refers to biological activity of the chemical compounds in their pure state. The biological effects of particular compounds may or may not occur at the concentration levels that are found in diesel exhaust.

Table 1
Biological Impact of Diesel Emission Components

Emission Component	Atmospheric Reaction Products	Biological Impact
Gas Phase		
Carbon monoxide	-	Highly toxic to humans; blocks oxygen uptake.
Nitrogen oxides	Nitric acid, ozone	Nitrogen dioxide is a respiratory tract irritant and major ozone precursor. Nitric acid contributes to acid rain.
Sulfur dioxide	Sulfuric acid	Respiratory tract irritation. Contributor to acid rain.
Carbon dioxide	-	Major contributor to global warming.
Saturated hydrocarbons (Alkanes, < C_{19})	Aldehydes, alkyl nitrates, ketones	Respiratory tract irritation. Reaction products are ozone precursors (in the presence of NOx).
Unsaturated hydrocarbons (Alkenes < C_5)	Aldehydes, ketones	Respiratory tract irritation. Some alkenes are mutagenic and carcinogenic. Reaction products are ozone precursors (in the presence of NOx).
Formaldehyde	Carbon monoxide, hydroperoxyl radicals	Formaldehyde is a probable human carcinogen and an ozone precursor (in the presence of NOx).
Higher aldehydes (e.g., acrolein)	Peroxyacyl nitrates	Respiratory tract and eye irritation; causes plant damage.
Monocyclic aromatic compounds (e.g. benzene, toluene)	Hydroxylated and hydroxylated-nitro derivatives	Benzene is toxic and carcinogenic in humans. Some reaction products are mutagenic in bacteria (Ames assay).
PAHs (< 5 rings) (e.g. phenanthrene, fluoroanthene)	Nitro-PAHs (<5 rings)	Some of these PAHs and nitro-PAHs are known mutagens and carcinogens.
Nitro-PAHs (2 and 3 rings) (e.g. nitronaphtalenes)	Quinones and hydroxylated-nitro derivatives	Some reaction products are mutagenic in bacteria (Ames assay).
Particulate Phase		
Elemental carbon	-	Nuclei adsorb organic compounds; size permits transport deep into the lungs (alveoli).
Inorganic sulfates	-	Respiratory tract irritation.
Aliphatic hydrocarbons (C_{14}-C_{35})	Little information; possibly aldehydes, ketones, and alkyl nitrates	Unknown.
PAHs (4 rings and more) (e.g., pyrene, benzo(a)pyrene)	Nitro-PAHs (4 rings and more), nitro-PAH lactones	Larger PAHs are major contributors of carcinogens in combustion emissions. Many nitro-PAHs are potent mutagens and carcinogens.
Nitro-PAHs (3 rings and more) (e.g., nitropyrenes)	Hydroxylated-nitro derivatives	Many nitro-PAHs are potent mutagens and carcinogens. Some reaction products are mutagenic in bacteria (Ames assay).

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Environmental Impact of Diesel Engines in Transportation Vehicles/Off-Road Engines

Diesel engines are utilized in both common and uncommon transport. They play a major role in the American economy, but also prove to be a very dangerous source of pollution. An off-road vehicle is just what it sounds like, a vehicle that does not travel by road such as the common car. The type of transportation included in this is comprised of locomotives, agricultural equipment such as tractors, construction and mining equipment like graders and back hoes, and also marine vessels. Off-road diesel engines are much like their counterparts that are used in normal passenger vehicles, except that they don't have the emission controls that are commonplace in on-road cars. In both on-road and off-road transport, diesel engines can be found nationwide, and their effects on the environment can be identified easily.

MODERN ENGINES ARE NOW USING EGR, BUT THEY SOOT UP & DON'T WORK BIG PROBLEM FOR MECHANICS & LOCOS.

http//static.howstuffworks.com/gif/ozone-pollution-smog.jpg

Environmental Impact of Diesel Engines in Transportation Vehicles

Diesel exhaust contains fine particulate matter, and diesel engines are one of the largest sources of these particles. These can be a serious health problem as they can easily become lodged in the lungs, thus causing lung damage and potentially death. Also, they can provoke already prevalent respiratory conditions, especially bronchitis and asthma. The exhaust from diesel engines can also cause cancer in human beings. It is estimated that fine particulate matter, many of which coming from the exhaust of diesel engines, causes about 15,000 premature deaths yearly in the United States. People with already existing health problems such as asthma, as well as most children, are most at risk from fine particulate matter. Not only is diesel exhaust from on-road vehicles damaging to one's health, it also contributes to haze, acid rain, ozone formation, and climate change globally. There are things that owners of diesel engine on-road vehicles do, including:

- - Turn off the engine when just waiting or "idling", as the longer you leave the car running the more significant the damage done by your car's emissions will be.
- - Owners can buy small generators that provide heat, AC, or power while the vehicle is parked, so

that the car can be turned off while "idling".

- - Owners can buy starting aids such as block heaters that will help to warm the engine to avoid difficulties when starting and help reduce "idling" time.

The diesel engines used in the common car are considered very efficient compared to gasoline engines. In this way, it may be more economic to choose a car with a diesel engine, as you will get farther on what you have. While many consider diesel engines to be a dirty variety as their emissions are far more polluting than those of the gasoline engine, changes are underway. The U.S. has made adjustments in 2006 that have employed the usage of diesel fuel with ultra-low sulfur content. This will help to eliminate much of the irritating exhaust fumes you used to get from diesel engines. Thus, the diesel engine in transportation vehicles could soon be legitimately more preferable than the gasoline engine many are accustomed to. This ultra-low sulfur diesel that is being forced upon American engines will prevent incredible amounts of pollution as it is phased into usage, and will lower the sulfur content in highway diesel fuel from 500 parts per million to 15 parts per million. Once this change in policy has been completed, the following changes will have been made:

- - 2.6 million tons of smog-causing nitrogen oxide emissions will be reduced yearly.
- - Soot will be reduced by 110,000 tons a year.
- - About 8,300 premature deaths, 17,600 cases of acute bronchitis in children and 5,500 cases of chronic bronchitis will be prevented per year.
- - About 360,000 asthma attacks and 386,000 cases of respiratory symptoms in children will be prevented each year.
- - 1.5 million missed work days, 7,100 hospital visits and 2,400 emergency room visits for asthma will be completely avoided each year.

http://www.drgreene.org/images/cg/19346.jpg

Environmental Impact of Diesel Engines in Off-road Transport

Currently, diesel-powered engines remain one of the most dangerous sources of air pollution. This is also the case with the off-road transportation that uses diesel engines, with an example being that commercial ships in the United States emit about 1,000,000 tons of smog-forming nitrogen oxides yearly, the same amount that you would need millions of cars in order to produce. As said before, these sources include locomotives, construction and mining equipment, agricultural equipment, and commercial marine ships. As a group, off-road engines discharge more fine particulate sooty matter than any other source of transportation. This group lacks the advanced emission controls seen in on-road vehicles, and thus has

been poorly controlled up until this point. Since 1980, annual nitrogen oxide discharges have increased 25% from off-road engines, making up a significant portion of all United States emissions of nitrogen oxide. Similar to on-road vehicles, off-road diesel engines are also helping to contribute to acid rain, reduced visibility as a result of haze, and the corrosion of estuaries. Nonroad engines can also be given some of the responsibility for the asthma attacks that soot and smog can provoke, and the increased risk of lung cancer that comes from this carcinogenic particulate sooty matter. Lastly, diesel engines are also responsible for great amounts of nationwide sulfur dioxide pollution, brown clouds over urban areas and haze in national parks.

The government has taken an active role in this problem, and has produced some new regulations that will attempt to reduce the toxic emissions of some off-road sources such as bulldozers and tractors. The lower-sulfur diesel fuel mentioned earlier is being put into use in certain off-road vehicles as well, and can help to reduce particulate matter pollution by more than 90%. These new rules are going to be phased in by 2008 and put into full-scale use by 2015. As a result, sulfur content will be slashed by 99% by 2010, and commercial shipping and locomotives will be required to follow these guidelines as well by 2012. Diesel machines classified as off-road will be subjected to stricter guidelines including those used in mining, agriculture, construction, and industrial work.

New programs were also announced that plan to tighten emission standards for commercial ships and locomotives, and would apply to new marine diesel engines and both new and re-manufactured diesel locomotives. Although locomotives and marine commercial vessels that run on diesel are placed in the broad category of off-road diesel vehicles, the EPA has separate regulations for each. Ultimately, the Environmental Protection Agency estimates that by 2030, the changes that are being made now will prevent about 12,000 premature deaths, 6,000 asthma related ER visits, 9,000 hospitalizations, 15,000 heart attacks, and 1,000,000 missed work days each year. With changes expected as drastic as these, there is a justified hope for a cleaner and safer future.

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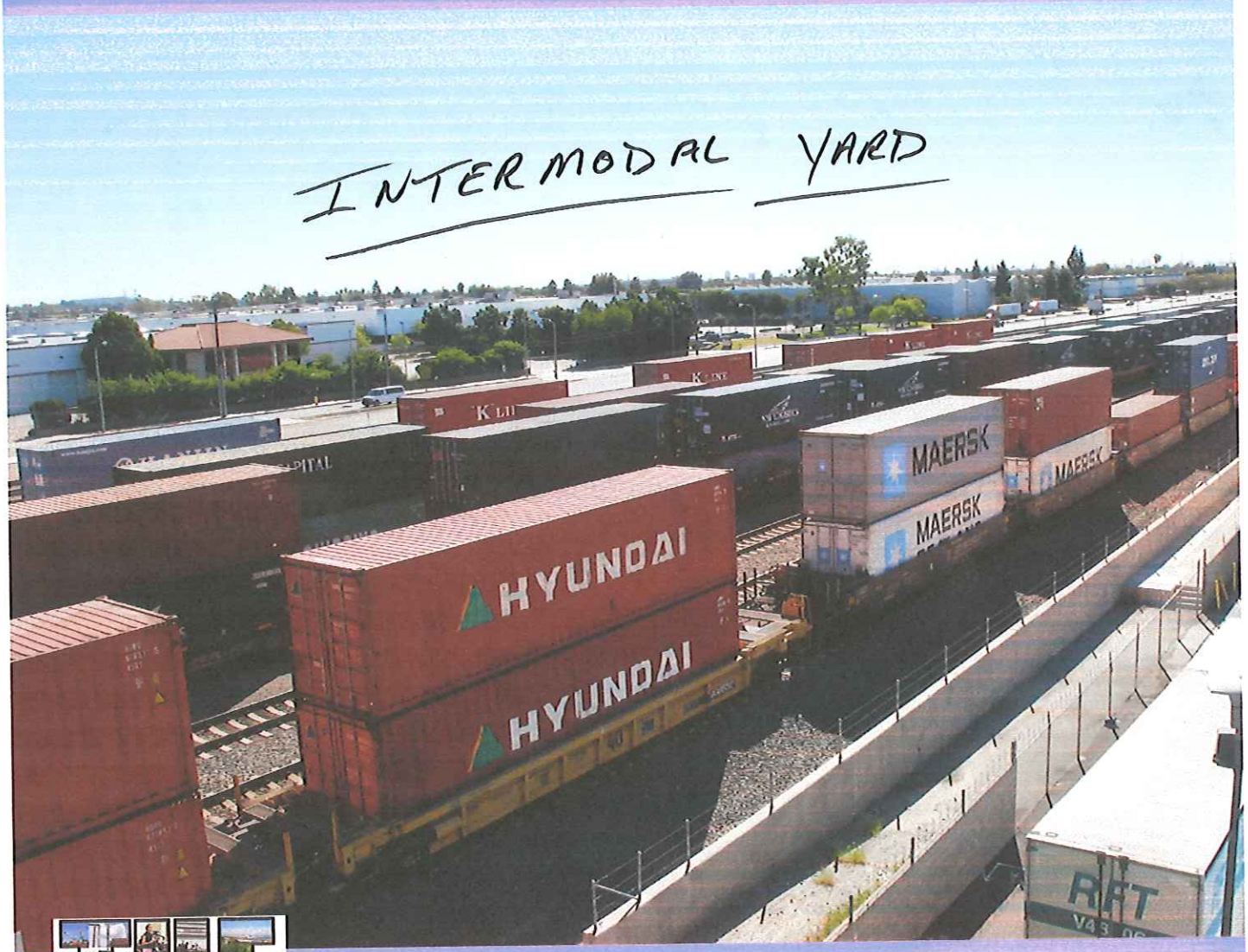
Tracking Harm: Health and Environmental Impacts of Rail Yards

THE Impact Project Policy Brief Series

January 2012



Trade, Health and Environment Impact Project
www.theimpactproject.org

Impact Project
Trade·Health·Environment

Introduction

This report examines the role of rail yards in the goods movement system. Shipping containers arrive at marine ports and are transported to local rail yards by truck, and then transferred to trains for travel to their final destinations elsewhere in the country. This report highlights the health and community impacts from rail yards that are located in close proximity to homes, schools, and other sensitive receptors. Furthermore, the brief also draws upon the experience of environmental justice and public health organizations to suggest policy solutions for reducing harmful impacts from rail yards.

The Railroad Industry

The country's two largest freight railroads operate primarily in the western United States. These are BNSF Railway Company, which operates 32,000 route miles in 28 states and Union Pacific Corporation, which operates 32,100 route miles in 23 states[1]. In California these two railroad companies operate 18 major rail yards. The largest freight railroads operating in the rest of the country are Norfolk Southern and CSX. *Figure 2* lists the operational revenue of the country's top railroads in 2008.[2]

Rail Yards

Southern California has the country's busiest container ports, with large volumes of international trade, much of it from Southeast Asia[3]. Once the containers arrive at the Ports of Los Angeles or Long Beach, they move to their destinations by truck or by train. Close to 50% of the goods entering these two Ports are destined for east of the Rockies – and will get there by rail,[4] through one of the following scenarios. This always involves the container going to a railroad or intermodal facility. A rail yard or intermodal facility is a location where containers are moved from one mode of transport to another. For example, from a truck to a train or vice versa.

(1) A container comes into the ports and is transferred from a ship to a train, which leaves the port property and hauls the containers out of California.

(2) A container comes into the ports and is transferred from a ship to a truck, which then travels to a local rail yard where the container is placed onto a train, hauling containers East or North; the yard may be 5 to 20 miles from the ports.

(3) A container comes into the ports and is transferred from a ship to a truck, which heads to a distribution center or warehouse, or to a "transload center." A transloading center can

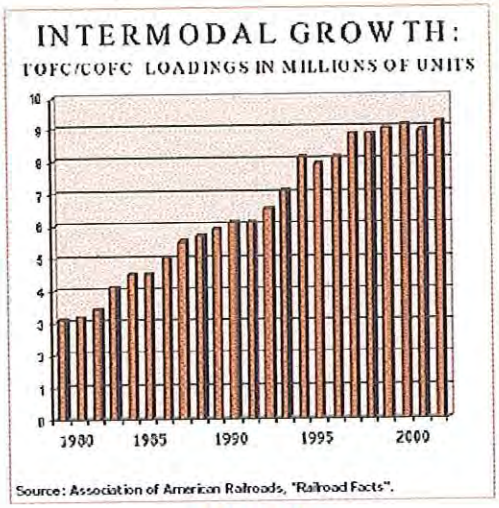


Figure 1

be a private warehouse center or a U.S. Customs warehouse. These facilities may be anywhere from 5 to 20 miles from the ports. At these facilities, the contents of the 40-foot international containers are repackaged and placed into larger 53-foot containers (saving retailers shipping costs) before heading to a rail yard to be placed on a train.

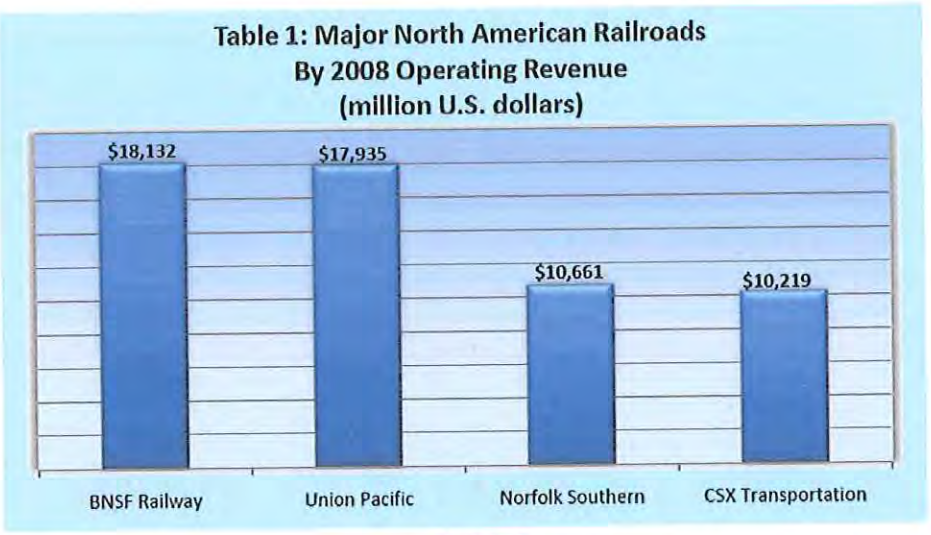


Figure 2

Rail yards employ a variety of equipment and vehicles that operate on diesel fuel. These include trucks, cranes, yard hostlers, switch locomotives, and line-haul locomotives. Switch locomotives move trains around the yard; line haul locomotives haul freight long distances.

Figure 1 shows the tremendous growth in intermodal rail traffic over the past several decades. Although cargo volume decreased recently because of the economic downturn, recent port projections see a steady rise in cargo growth that is projected to triple by 2030[5]. Due to the projected growth and the fact that existing local rail yards are reaching capacity, numerous railroads are proposing expanding existing yards and building new rail yards. Many of these yards are being proposed in close proximity to places where "sensitive receptors" live, learn, or play — homes, schools, nursing homes, day care centers, and parks.[6]

Case-Study - BNSF Hobart

BNSF's Hobart rail yard in Commerce, California is the largest rail yard of its kind in the United States. The 243-acre yard, which BNSF says has reached capacity, handles 1.5 million containers a year. The facility is classified as an intermodal yard, meaning inside the yard containers are transferred from trucks, which travel the 20 miles from the port, to rail for distribution across the country.

According to a Health Risk Assessment done by the California Air Resources Board, communities living near the yard are exposed to an increased risk of 250 chances in a million of developing cancer. It is estimated that 315,000 people are exposed to an excess cancer risk of at least 10 in a million (the Environmental Protection Agency's acceptable risk) around the BNSF Hobart rail yard.[1]

Source: Li, W. (2007). Health Risk Assessment for the BNSF Railway. Hobart Railyard. California Environmental Protection Agency and California Air Resources Board. www.arb.ca.gov/railyard/hra/bnsf_hobart_hra.pdf

Community Impacts

Communities in the California South Coast Air Basin in close proximity to rail yards include the cities of Colton, Commerce, East Los Angeles, Industry, Lincoln Heights (in the City of Los Angeles), Riverside, San Bernardino, Carson, West Long Beach, and Wilmington. Many additional communities are affected by polluting trucks traveling to the rail yards and locomotives crossing through their neighborhoods. These trucks and trains are major contributors to traffic congestion in Southern California and other parts of the South Coast Air Basin.

Operation of the trucks, locomotives, and yard equipment that service rail yards negatively affects communities' health and quality of life with increased air pollution, noise, traffic congestion, and industrial blight. Most rail yards operate round-the-clock, with stadium style lights allowing night-time operations. Of particular concern are diesel particulate emissions, which have been linked to lung cancer and other health effects.[7]

In 2005, the California Air Resources Board conducted Health Risk Assessments for the 18 major California rail yards. This assessment looks at the rail yard's emissions inventory, wind dispersion data, where people live in relationship to the yard, and other factors that help the agency calculate the increased cancer risk caused by rail yard operations, including the emissions from diesel engines operating at the rail yard. The HRAs found that in total, the 18 rail yards are responsible for 210 tons of diesel pollution emissions a year, posing a significant public health risk and putting more than 3 million people at an elevated risk of cancer.[8] Four of the rail yards (see Figure 3) pose an excessive cancer risk of 500-3,300 chances per million. This means that people living in close proximity to the rail yard have a higher risk of cancer compared to other residents who do not live near the yards.

Figure 3.

Rail Yard	Location	Total Cancer Risk PMI (point of max. impact)
BNSF	*San Bernardino*	3300
4 rail yards combined (UP and BNSF)	*Commerce*	3000
Union Pacific	*Roseville*	1000
Union Pacific	*Oakland*	640

Regulatory Issues

Communities across California have struggled to implement more stringent regulations on locomotives and rail operations, due to overlapping regulatory authority between national, state, and local entities. In 2004, community organizations worked to pass state legislation that would require the rail companies to reduce their emissions to levels that would protect public health. The rail companies countered that the state could not regulate locomotive emissions.[9] In lieu of regulations or state legislation, the California Air Resources Board, BNSF Railroad, and

Union Pacific Railroad entered into a voluntary agreement without public process or input, and continue to use this type of agreement as their strategy for addressing emissions from rail yards and locomotives. Environmental justice organizations believe that this approach does not adequately reduce health and community impacts, and have continued to advocate for emission reduction regulations.

Community Action for Change

"I have lived in the Ayers Neighborhood in the City of Commerce for 33 years. For some time the noise from the locomotives and other equipment used in the rail yard has become unbearable. The constant beeping, tire changing, drilling, and banging on the containers, only to name a few. The noise from the locomotives can vary but will usually happen at night, typically running 2 or 3 engines at the same time about every hour at full speed. All of this affects how and when we go outside, how much rest we get and how much noise we will be exposed to. I am concerned about the smoke from the idling engines and what effect it will have on my health."

-Maria Vargas, resident

Over the last eight years, community members living in environmental justice neighborhoods have engaged in efforts to reduce pollution and adverse health impacts from rail yard facilities and related operations. Thousands of people have participated and testified in hearings, public meetings, and briefings. Communities have taken direct action throughout Southern California from San Bernardino to Commerce to West Long Beach to raise awareness on the impact that rail yard activity has on their health and quality of life. Community members have conducted demonstrations and protests that have elevated the public policy debate. In addition, they have mounted a billboard campaign to draw attention to diesel pollution near the rail yard in San Bernardino.

Rail yard pollution is certainly not just a California problem. Chicago has some of the largest rail yards in the United States and organizations there are beginning to evaluate the risks. Residents in Kansas are fighting for a more detailed environmental review on a large new intermodal rail yard in their state that would be the destination for cargo on BNSF trains from Los Angeles on their way to the Midwest. In Australia, more than 1,000 residents turned out to protest what is touted to be the largest intermodal facility in Australia, The Moorebank Terminal.[10] [11]

Policy Recommendations

The operations of rail yards and the passing diesel trucks through communities on their way to the ports and rail yards also impacts health and quality of life in adjacent communities. Policy makers and the railroad industry need to act responsibly to reduce impacts from rail yard operations. The Impact Project is committed to zero emissions technologies and regulations across all stages of goods movement. Policy recommendations to reduce rather than eliminate emissions should be considered important interim steps towards achieving zero emissions.

Promising policies and solutions that can be implemented include:

1. Strengthen federal regulation of locomotives
   - The Federal Government should strengthen federal regulation of emissions from the railroad industry. The 1990 Clean Air Act amendments give the U.S. EPA the power to adopt emission standards for new non-road engines including locomotive engines. Existing locomotive regulations have given too much time to the railroads to clean up the diesel emissions. Emission reductions should all be toward the goal of zero emissions.

2. Seek federal authority to allow additional state and local regulation of locomotives
   - The Federal Government should give states and local government or regional environmental agencies additional authority to address local air pollution caused by rail yards.[12]
   - Change regulations to allow rail yards to be regulated as stationary sources, so that local government agencies such as Air Quality Management Districts have the ability to control emissions.

3. Strengthen state regulation of rail yard equipment
   U.S. EPA has confirmed that state regulation of rail equipment other than locomotives (such as older, polluting switch locomotives) is not preempted by federal law and these technologies are subject to regulation by California and other states[13]. We recommend that states:
   - Require railroads to replace all diesel fuel switch locomotives, cranes, yard hostlers, trucks and equipment with zero emission electric power equivalents or other lower emission technologies as soon as is feasible.
   - Mandate that all switch locomotives, cranes, yard hostlers, trucks, and equipment use the maximum achievable air pollution control technology.
   - Mandate the use of alternative technologies such as Advanced Locomotive Emissions Control System which uses an exhaust hood to capture and scrub clean the smoke stack emissions.[14]
   - Mandate that rail yards incorporate a 100% closed loop vapor recovery system in all diesel fuel storage tanks to prevent release of fugitive emissions.

4. Use land use rules and alternative transportation strategies to limit health impacts

- The California Air Resources Board created land use guidelines that include "Avoid siting new sensitive land uses within 1000 feet of a service or maintenance yard."[15] The guidelines also state that: "Within one mile of a rail yard, consider possible siting limitations and mitigation approaches."[16] These guidelines should become mandatory, and should work in both directions. That means that a new rail yard should not be allowed to be sited within one mile of sensitive receptors.
- Eliminate near-dock rail yards, and instead use on-dock rail that transfers a container directly from a ship onto a train. For existing near-dock rail yards, transition to zero-emissions equipment.

5. Use city and county level measures
   - Cities/Counties have the right to refuse to issue business licenses. They can also refuse requested waivers, variances and conditional use permits, or refuse to permit facility expansion.
   - Cities/Counties can revise master plans to limit certain types of industry growth.
   - Cities/Counties can establish a facility truck operating capacity limit. This limits truck traffic, congestion, and accidents.
   - Cities/Counties can charge extra street maintenance and repair fees for truck usage which causes a 50% reduction in the life of the public infrastructure.
   - Cities/counties can require lower lighting and light deflectors to prevent light intruding in fenceline residential areas.
   - Cities/Counties can restrict truck routes, and post no stopping and parking signs.
   - Cities/Counties can restrict hours of operation to limit noise to nearby residential areas at night, as well as require sound barriers and higher walls.
   - Cities/Counties can impose decorative block walls, fences, container/cargo storage height requirements, landscaping and weekly street cleaning.
   - Cities/Counties can charge higher license fees which can be used to mitigate environmental, public health, community, public safety, city economic cost impacts such as extra city services support for police, fire department, public safety, business site inspections and city utilities whereby the city and residences pick up the majority of costs for new power plants, transmission lines etc.
   - Cities/Counties can designate where facility entrances, gates, and parking lots are located.
   - Cities/Counties can require Emergency Response, Evacuation and Public Care Plan.

6. Require additional air quality monitoring and public notification from federal, state and regional air regulatory agencies
   - Air quality agencies can perform 24/7 real time air quality monitoring at and nearby rail yard sites. This includes monitoring hot spot areas in fenceline communities.
   - Agencies can monitor all Criteria Pollutants and volatile organic compounds (VOCs) and Hazardous Air Pollutants.
   - Agencies should release findings of incident and violation reports to the public.
   - Agencies should publish an annual compliance and incident report.
   - Agencies can require a Health Impact Assessment, Community Nexus Impact

References

1 BNSF Railway. (2010). Fact Sheet. http://www.bnsf.com/about-bnsf/pdf/fact_sheet.pdf; Union Pacific Railroad. (2011). Union Pacific Fact Sheet. http://www.uprr.com/newsinfo/media_kit/about_up/index.shtml

2 Association of American Railroads. (2010, May 24). Class I Railroad Statistics. http://www.aar.org/~/media/aar/Industry%20Info/AAR%20Stats%202010%200524.ashx

3 US Department of Transportation, Maritime Administration. U.S. Waterborne Foreign Container Trade by U.S. Custom Port. http://www.marad.dot.gov/ports_landing_page/ports_landing_page.htm; Port of Long Beach. Facts at a glance. http://www.polb.com/about/facts.asp; Port of Los Angeles. Facts & Figures. http://www.portoflosangeles.org/newsroom/press_kit/facts.asp

4 Port of Los Angeles. Goods Movement Press Kit. www.portoflosangeles.org/newsroom/press_kit/goods.asp

5 California Air Resources Board. (2006, April). Emission Reduction Plan for Ports and Goods Movement in California.

6 Wyenn, M. (2009). Fighting for Clean Air: Community Members Speak Out Against Proposed Railyard Expansion near the LA and Long Beach Ports. NRDC Switchboard. October 9, 2009. http://switchboard.nrdc.org/blogs/mwyenn/fighting_for_clean_air_communi.html

7 Garshick, E. et al. (2004). Lung cancer in railroad workers exposed to diesel exhaust. Environ Health Perspect 112(15): 1539-43.

8 California Air Resources Board. (2007). Health Risk Assessments for the Four Commerce Railyards. http://www.arb.ca.gov/railyard/hra/4com_hra.pdf

9 Kracov, G. (2010, Spring). Who's regulating emissions from California's trains and rail yards? Environmental Law News.

10 Street Corner Southwest Sydney. Liverpool residents mass rally NO freight intermodal Moorebank. August 15, 2010. http://www.streetcorner.com.au/news/showPost.cfm?bid=18631&mycomm=SW

11 Tarasov, A. (2009, November). Moorebank freight terminal to be biggest in Australia. http://www.liverpoolchampion.com.au/news/local/news/general/moorebank-freight-terminal-to-be-biggest-in-australia/1680058.aspx

12 The California Air Resources Board's authority over rail yard and locomotive pollution comes from the State Health and Safety Code: the board shall adopt and implement control measures that are necessary, cost effective, and technologically feasible for mobile goods movement sources including heavy duty motor vehicles, utility engines and locomotives, unless preempted by federal law [California Health & Safety Code 43013, 43018].

13 Federal Register. Vol. 72, page 15971 (2007, April 3).

14 Advanced Locomotive Emissions Control System. www.advancedcleanup.com

15 California Air Resources Board. (2005). Air Quality and Land Use Handbook: A Community Health Perspective. http://www.arb.ca.gov/ch/landuse.htm.

16 Same as above.

IF THESE PROBLEMS ARE NOT PRESENT IN OUR AREA NOW, WHY WOULD ANY ONE ALOW IT/THEM TO COME HERE AT ALL?

RECREATIONAL AREAS

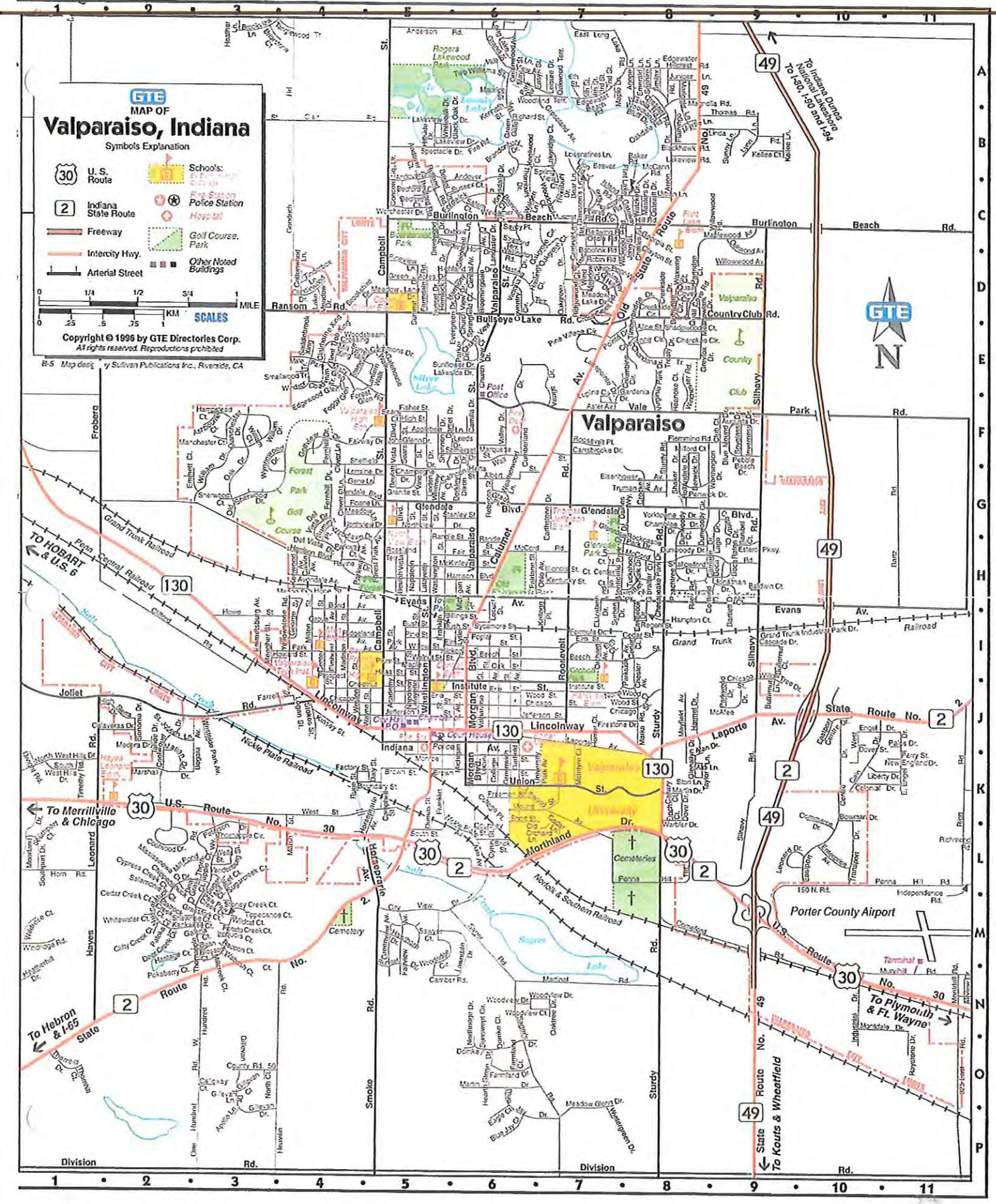
Waterways / Lakes:

- Porter County
- Lake County
- LaPorte County

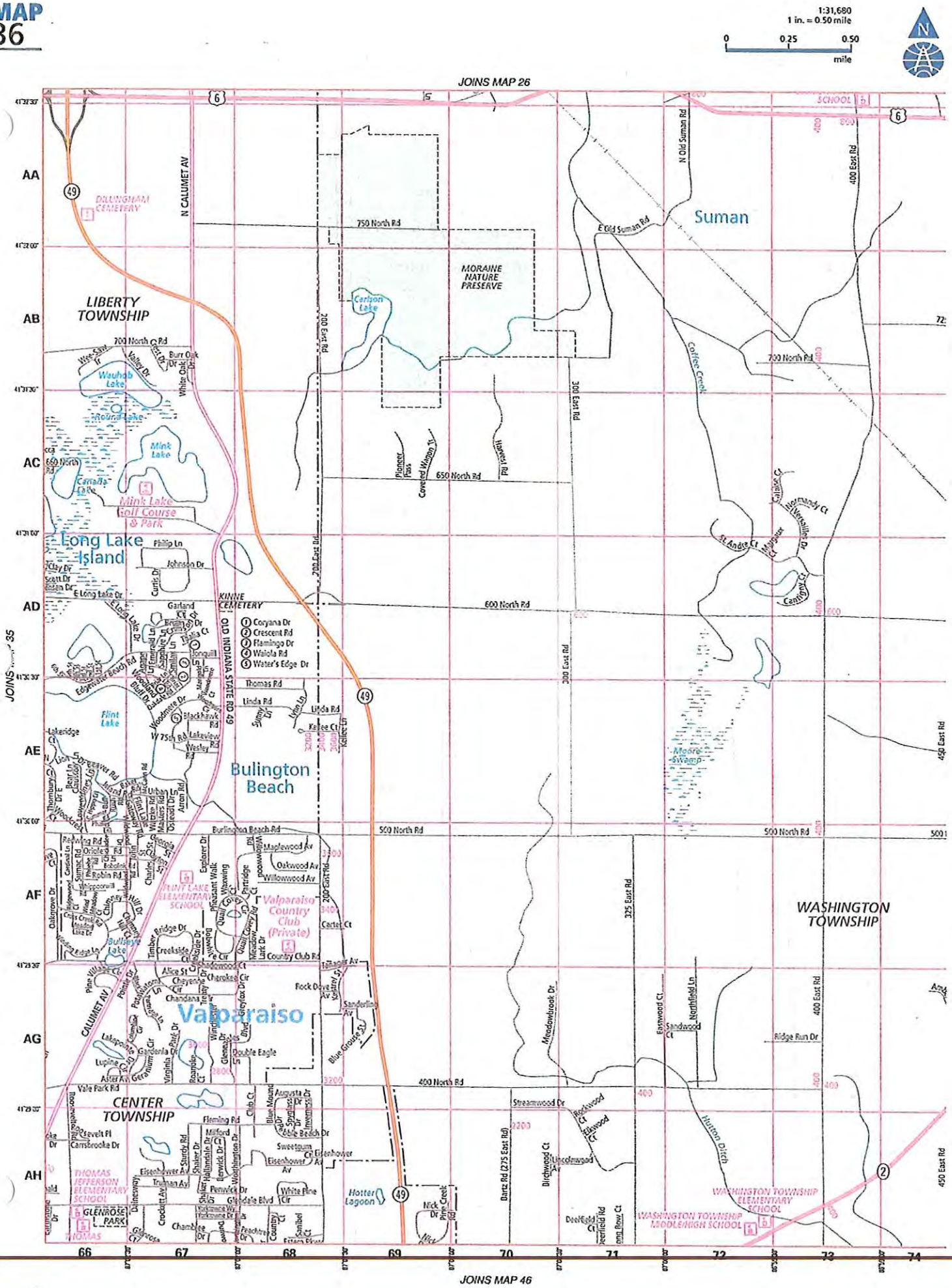
This is a listing of lakes for fishing and boating, swimming and camping.
Enclosed are maps, locations, descriptions and acreage, types of fish and wildlife, events for the public. All of these areas will be degraded to the point where we will not be able to afford to restore them thereby creating blight and many acres of lost natural resources.

VINCENT KUZNICKI
340 S. 350 W
VALPO IN 46385
219 242-4751

Roge.-Lakewood | Flint Lake | Long Lake



MAP 36


1:31,680
1 in. = 0.50 mile
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JOINS MAP 26
JOINS MAP 46
JOINS MAP 35
LIBERTY TOWNSHIP
CENTER TOWNSHIP
WASHINGTON TOWNSHIP
Suman
Bulington Beach
Long Lake Island
Valparaiso
MORAINE NATURE PRESERVE
Carlson Lake
Wauhob Lake
Round Lake
Mink Lake
Canada Lake
Mink Lake Golf Course & Park
Flint Lake
Bullseye Lake
Hotter Lagoon
Moore Swamp
Coffee Creek
Hutton Ditch
Valparaiso Country Club (Private)
FLINT LAKE ELEMENTARY SCHOOL
THOMAS JEFFERSON ELEMENTARY SCHOOL
WASHINGTON TOWNSHIP ELEMENTARY SCHOOL
WASHINGTON TOWNSHIP MIDDLE/HIGH SCHOOL
DILLINGHAM CEMETERY
KINNE CEMETERY
N CALUMET AV
OLD INDIANA STATE RD 49
200 East Rd
300 East Rd
325 East Rd
400 East Rd
450 East Rd
N Old Suman Rd
E Old Suman Rd
750 North Rd
700 North Rd
650 North Rd
600 North Rd
500 North Rd
400 North Rd
Burlington Beach Rd
E Long Lake Dr
Thomas Rd
Linda Rd
W 75th Rd
Country Club Rd
Ridge Run Dr
Streamwood Dr
Fleming Rd
Vale Park Rd
Covered Wagon Trl
Pioneer Pass
Harvest Rd
Barre Rd (275 East Rd)
1 Coryana Dr
2 Crescent Rd
3 Flamingo Dr
4 Wahola Rd
5 Water's Edge Dr
6 Blackhawk Rd
66
67
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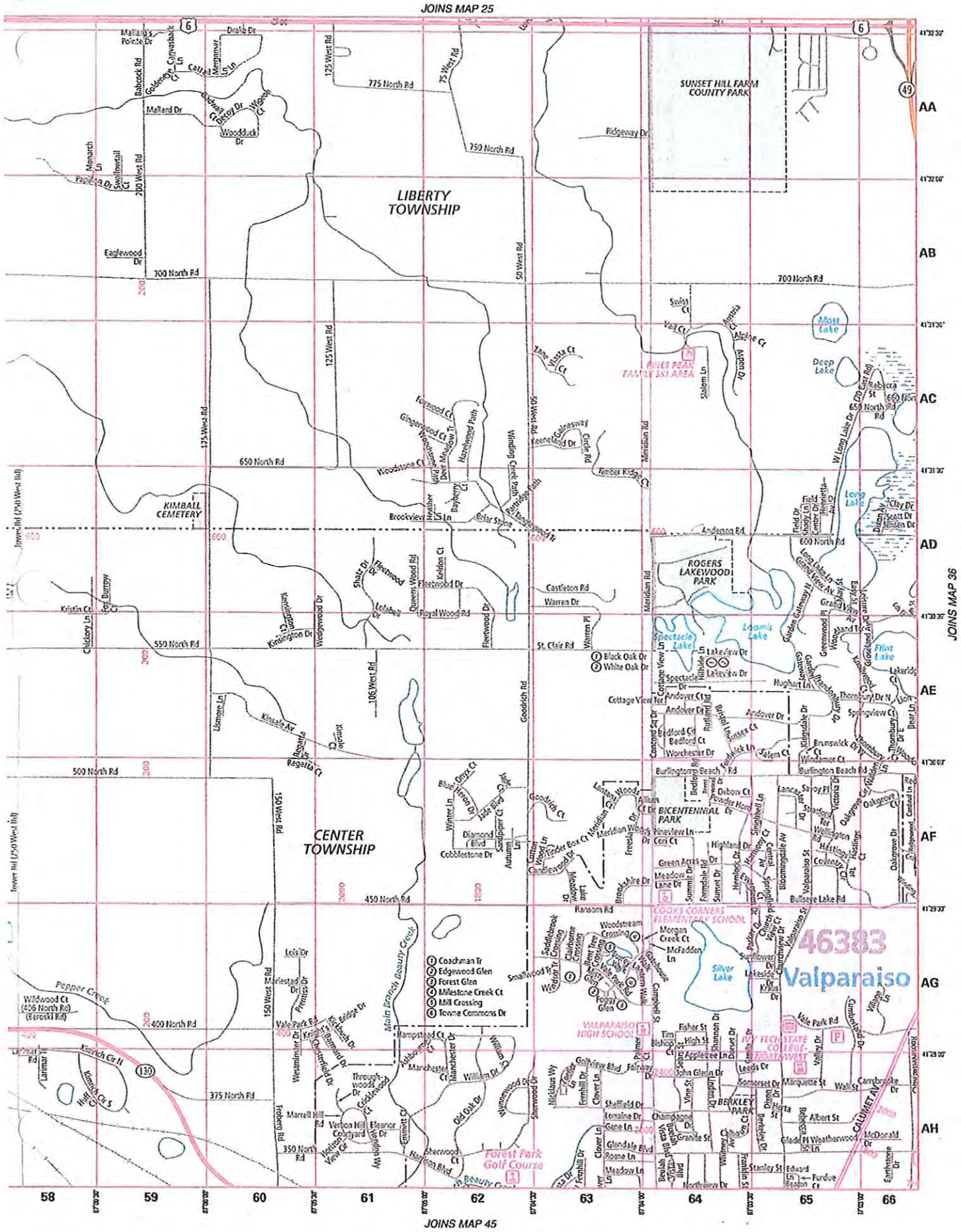

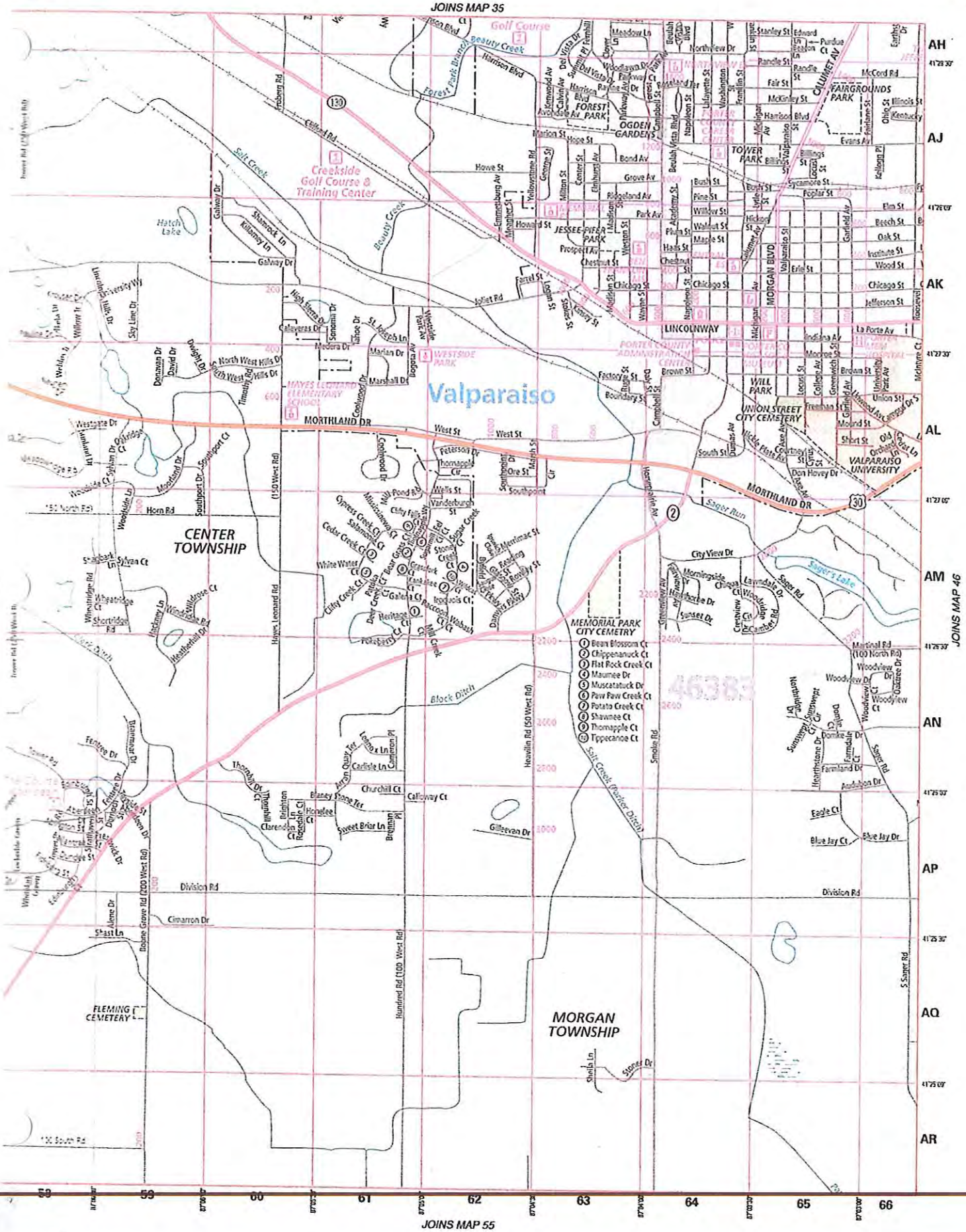
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1 in. = 0.50 mile
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JOINS MAP 35
Golf Course
Beauty Creek
Forest Park Branch
Harrison Blvd
Creekside Golf Course & Training Center
Salt Creek
Hatch Lake
Galway Dr
Shamrock Ln
Killarney Ln
Clifford Rd
Joliet Rd
Howe St
Hope St
Marion St
Bond Av
Grove Av
Ridgeland Av
Park Av
Willow St
Pine St
Walnut St
Maple St
Hass St
Chestnut St
Chicago St
Erie St
Sycamore St
Poplar St
Elm St
Beech St
Oak St
Institute St
Wood St
Jefferson St
La Porte Av
Indiana Av
Monroe St
Brown St
Union St
Mound St
Short St
Factory St
Boundary St
Valparaiso
LINCOLNWAY
MORGAN BLVD
JESSEE-PIPER PARK
WESTSIDE PARK
WILL PARK
FAIRGROUNDS PARK
TOWER PARK
FOREST PARK
OGDEN GARDENS
UNION STREET CITY CEMETERY
VALPARAISO UNIVERSITY
MAYES LEONARD ELEMENTARY SCHOOL
MORTHLAND DR
Sager Run
Sager's Lake
City View Dr
Sager Rd
Horn Rd
CENTER TOWNSHIP
MEMORIAL PARK CITY CEMETERY
Beam Blossom Ct
Chippenanuck Ct
Flat Rock Creek Ct
Maumee Dr
Muscatatuck Dr
Paw Paw Creek Ct
Potato Creek Ct
Shawnee Ct
Thornapple Ct
Tippecanoe Ct
Block Ditch
Salt Creek (Parker Ditch)
Division Rd
Cimarron Dr
FLEMING CEMETERY
MORGAN TOWNSHIP
Hundred Rd (100 West Rd)
Hewitt Rd (50 West Rd)
Hayes Leonard Rd
Smolen Rd
S Sanner Rd
Marshall Rd (100 North Rd)
Woodview Dr
Audubon Dr
Eagle Ct
Blue Jay Ct
Blue Jay Dr
Gilleevan Dr
Churchill Ct
Calloway Ct
Stonet Dr
Sheila Ln
AH
AJ
AK
AL
AM
AN
AP
AQ
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JOINS MAP 46
JOINS MAP 55
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65
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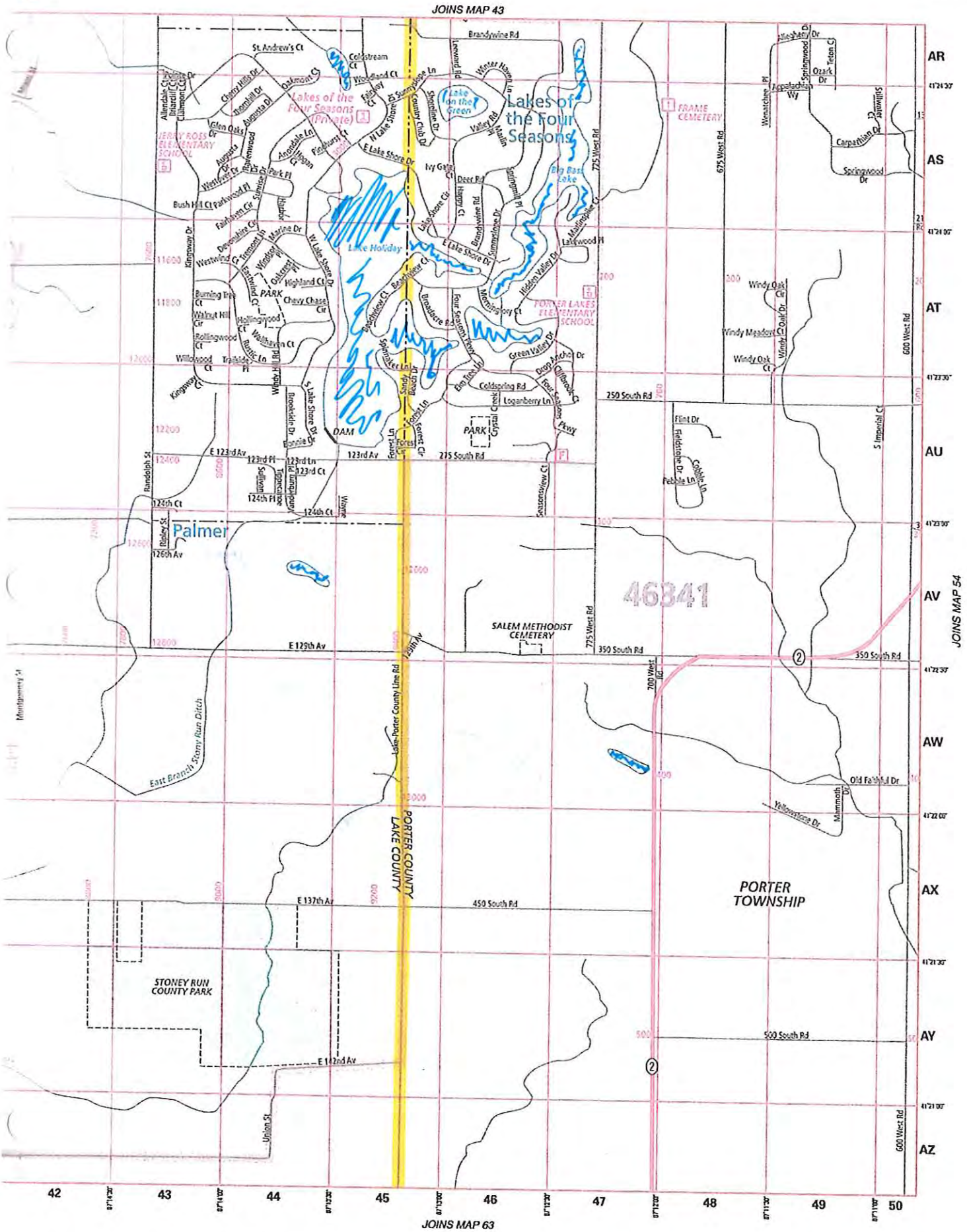
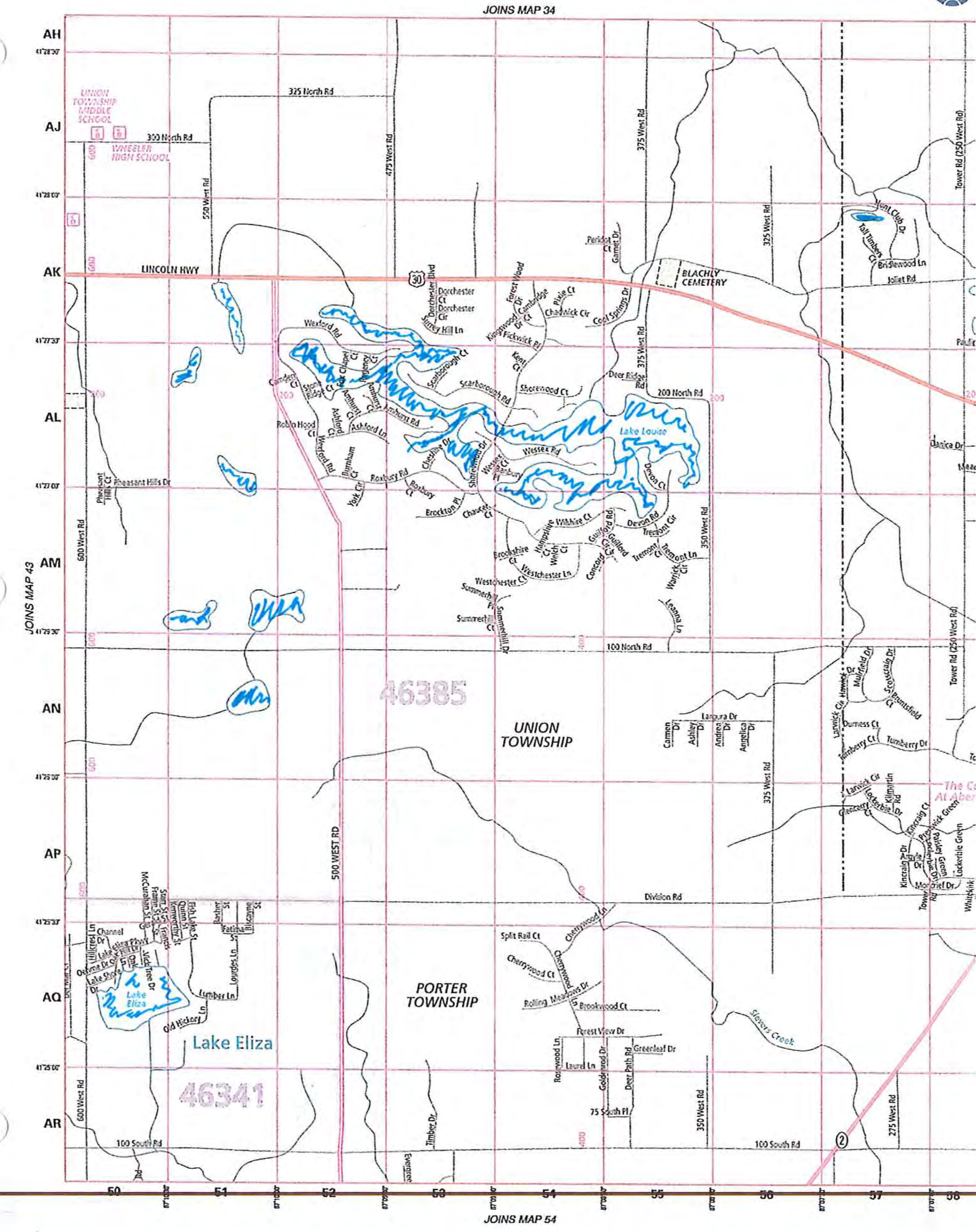
Miles




1:31,680
1 in. = 0.50 mile
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mile
N
JOINS MAP 34
JOINS MAP 43
JOINS MAP 54
UNION TOWNSHIP MIDDLE SCHOOL
WHEELER HIGH SCHOOL
UNION TOWNSHIP
PORTER TOWNSHIP
46385
46341
Lake Eliza
Lake Louise
BLACHLY CEMETERY
LINCOLN HWY
500 WEST RD
600 West Rd
550 West Rd
475 West Rd
375 West Rd
350 West Rd
325 West Rd
275 West Rd
Tower Rd (250 West Rd)
325 North Rd
300 North Rd
200 North Rd
100 North Rd
Division Rd
100 South Rd
Stevers Creek
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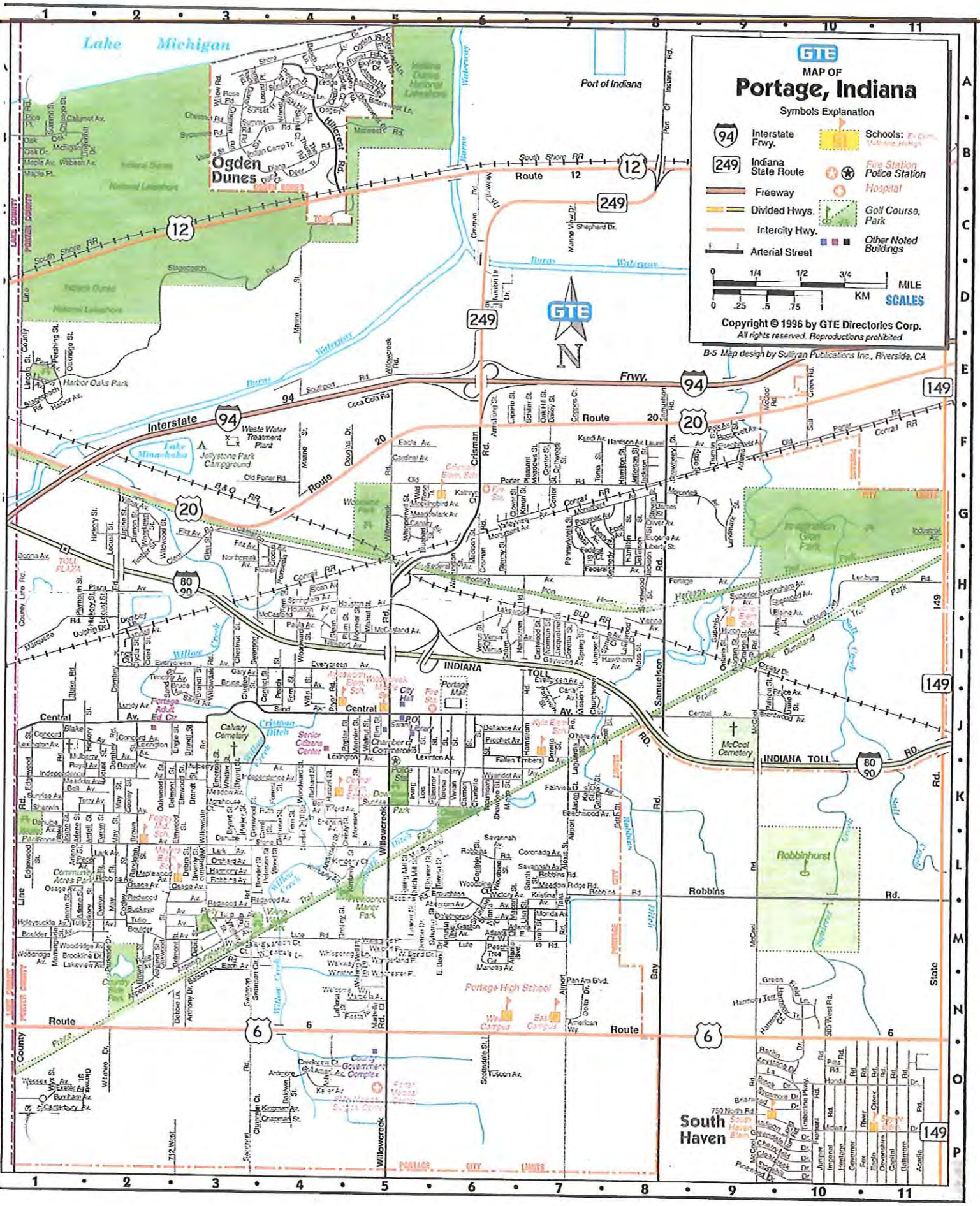
GTE
MAP OF
Portage, Indiana
Symbols Explanation
Interstate Fwy.
Indiana State Route
Freeway
Divided Hwys.
Intercity Hwy.
Arterial Street
Schools:
Fire Station
Police Station
Hospital
Golf Course, Park
Other Noted Buildings
MILE
KM
SCALES
Copyright © 1996 by GTE Directories Corp.
All rights reserved. Reproductions prohibited
B-5 Map design by Sullivan Publications Inc., Riverside, CA
Lake Michigan
Port of Indiana
Ogden Dunes
Indiana Dunes National Lakeshore
Route 12
South Shore RR
Interstate 94
Fwy.
Route 20
Route 6
Route 249
Route 149
INDIANA TOLL RD.
Portage High School
West Campus
East Campus
Robbinhurst
South Haven
Harbor Oaks Park
Jollystone Park Campground
Waste Water Treatment Plant
Lake Minnehaha
Calvary Cemetery
McCool Cemetery
Portage Mall
City Hall
Fire Sta.
Portage City Limits
Lake County
Porter County

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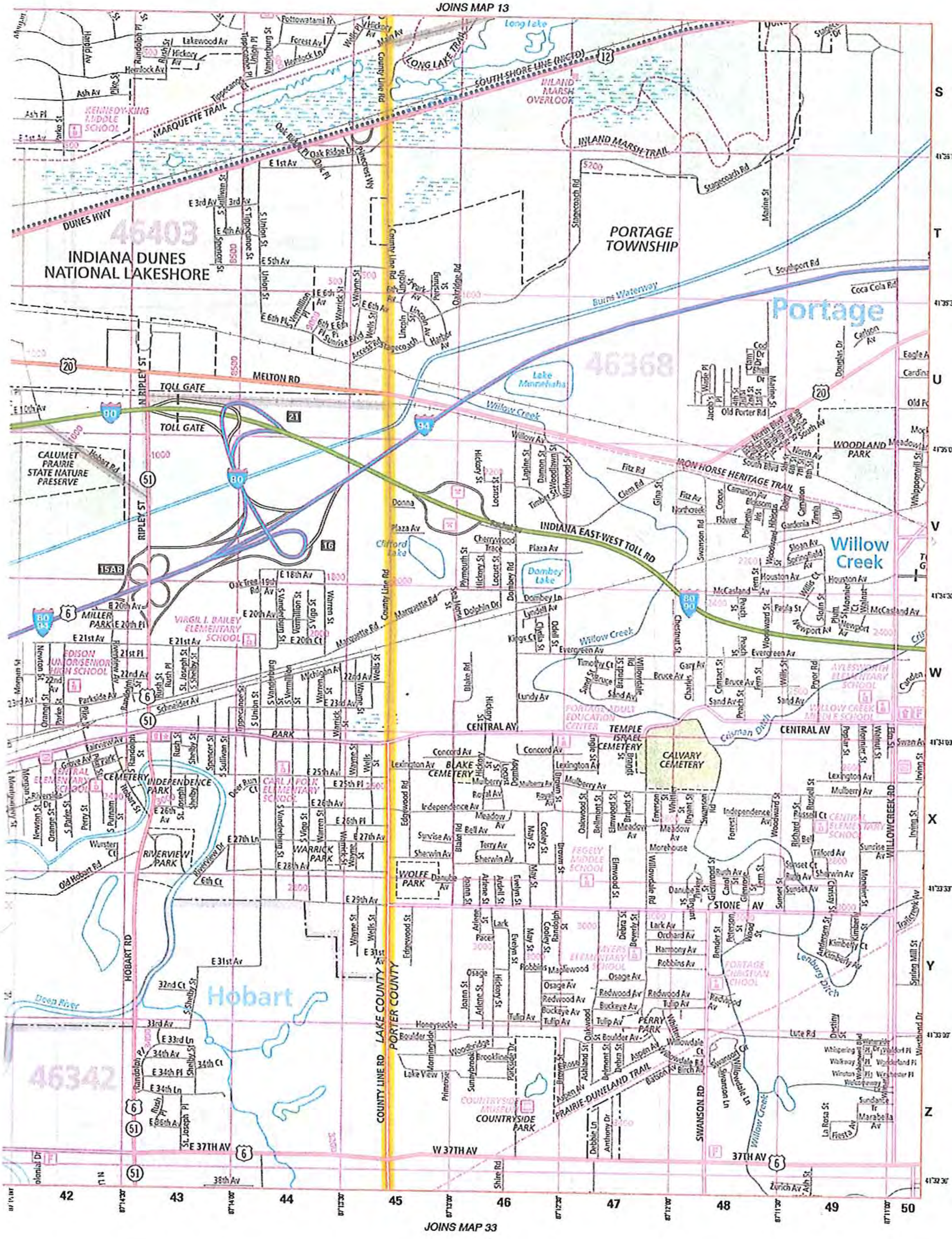

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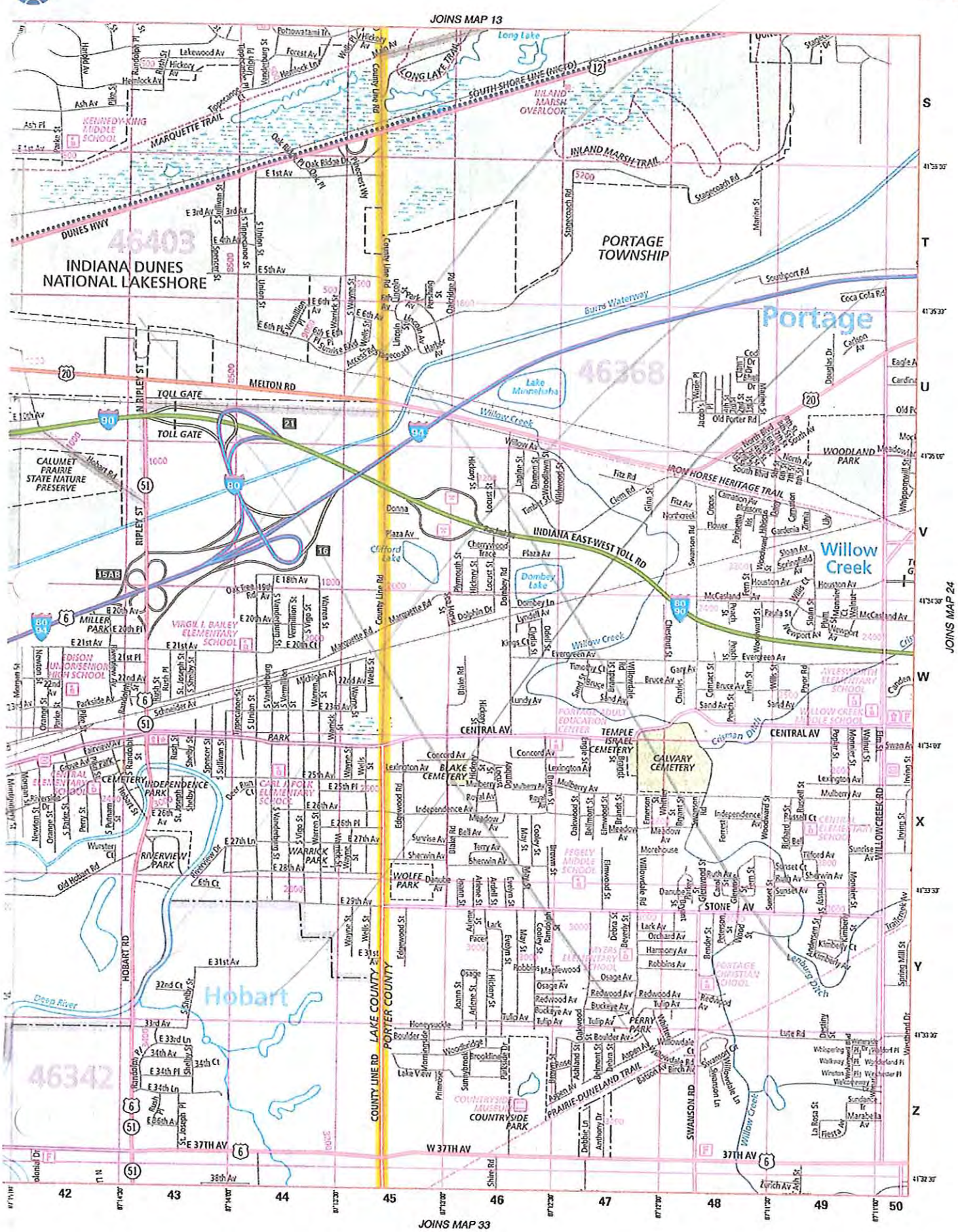

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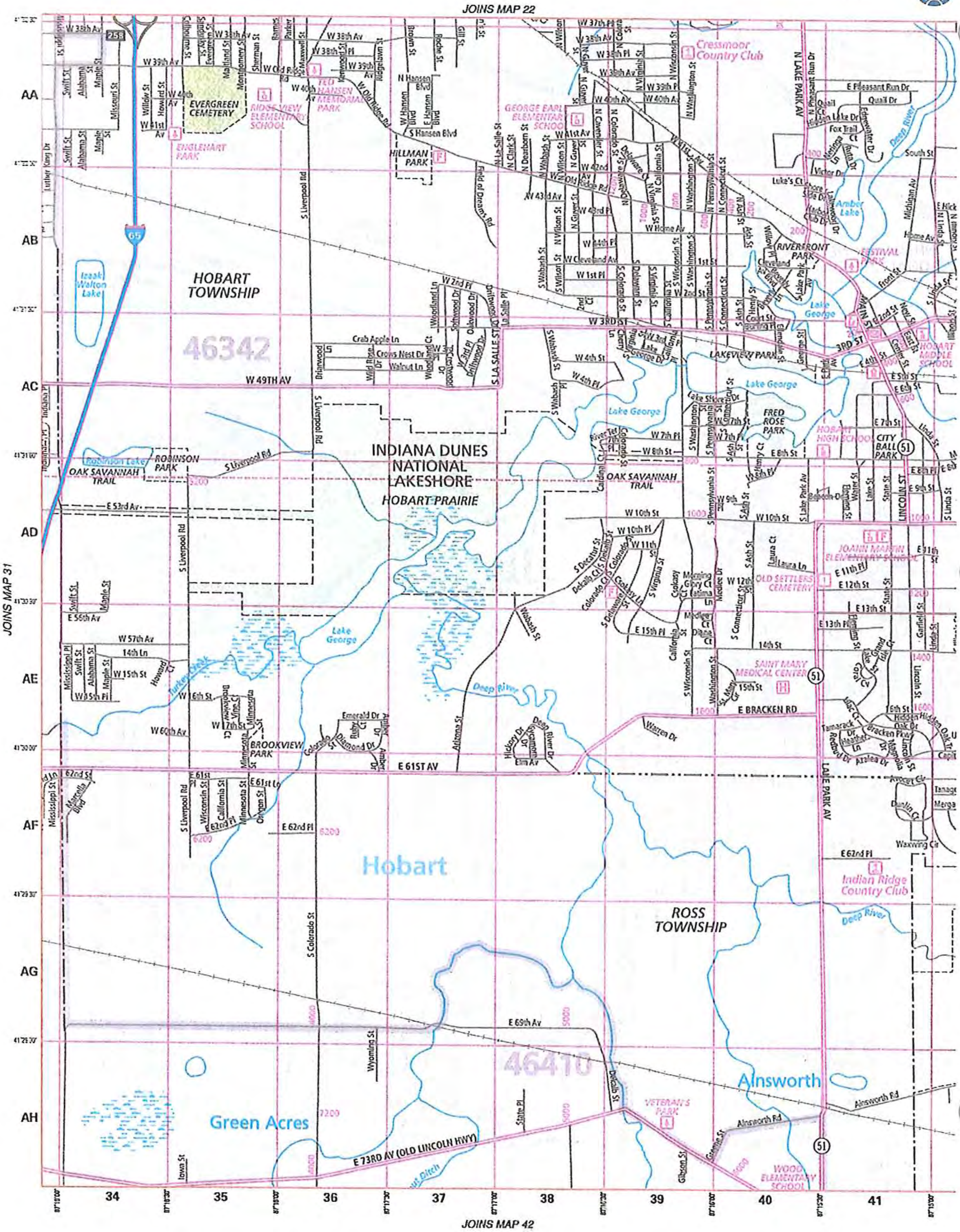

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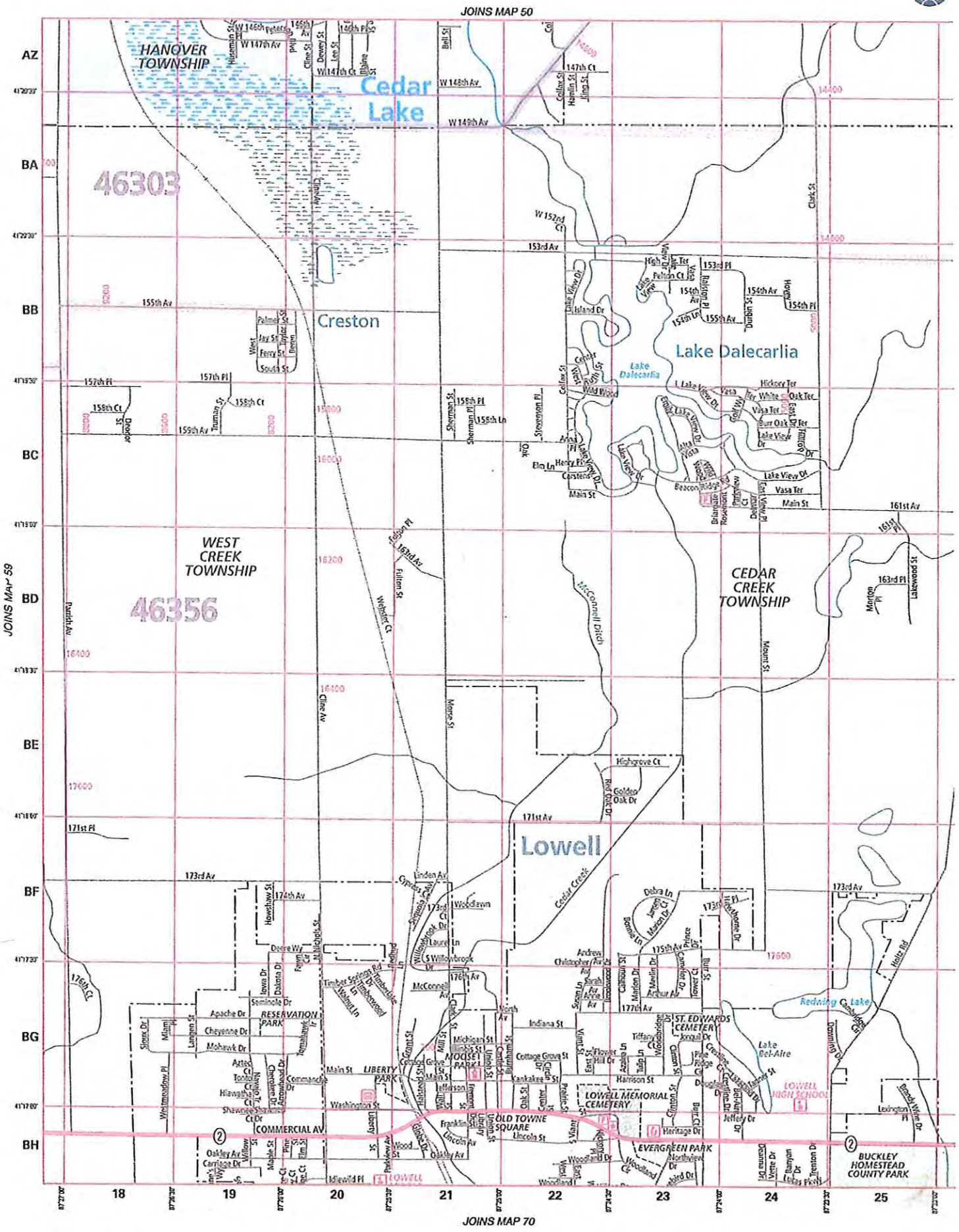

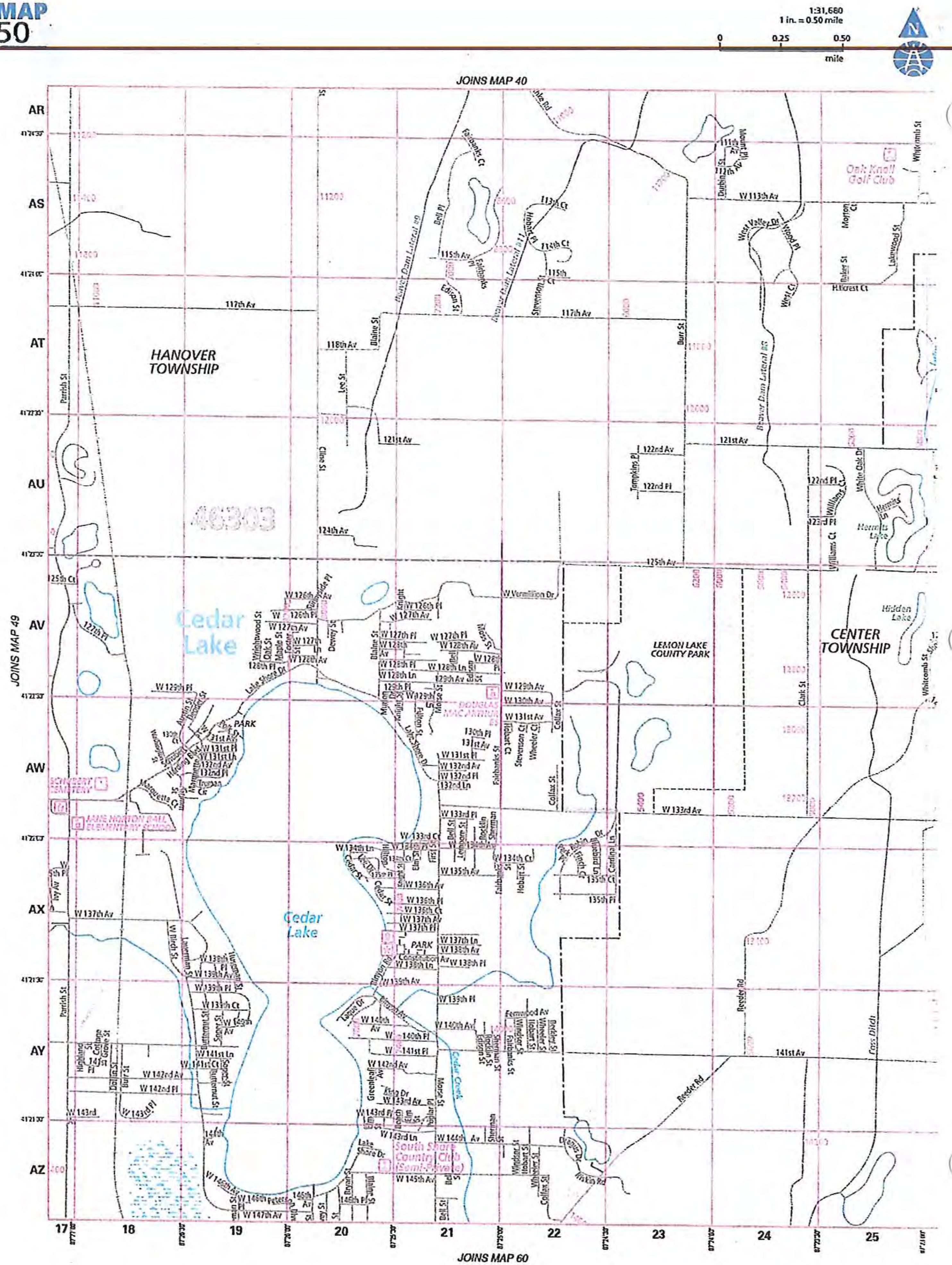
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N
JOINS MAP 40
JOINS MAP 49
JOINS MAP 60
HANOVER TOWNSHIP
CENTER TOWNSHIP
Cedar Lake
LEMON LAKE COUNTY PARK
Oak Knoll Golf Club
Hidden Lake
Hermits Lake
46303
PARK
DOUGLAS MAC ARTHUR ES
JANE NORTON BALL ELEMENTARY SCHOOL
SCHUBERT CEMETERY
South Shore Country Club (Semi-Private)
Cedar Creek
Beaver Dam Lateral 89
Beaver Dam Lateral 88
Foss Ditch
117th Av
121st Av
125th Av
W 133rd Av
141st Av
W 113th Av
Reeder Rd
Parrish St
Cline St
Burr St
Clark St
Whitcomb St
Lake Shore Dr
W 137th Av
W 145th Av
W 147th Av
AR
AS
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1 in. = 0.50 mile

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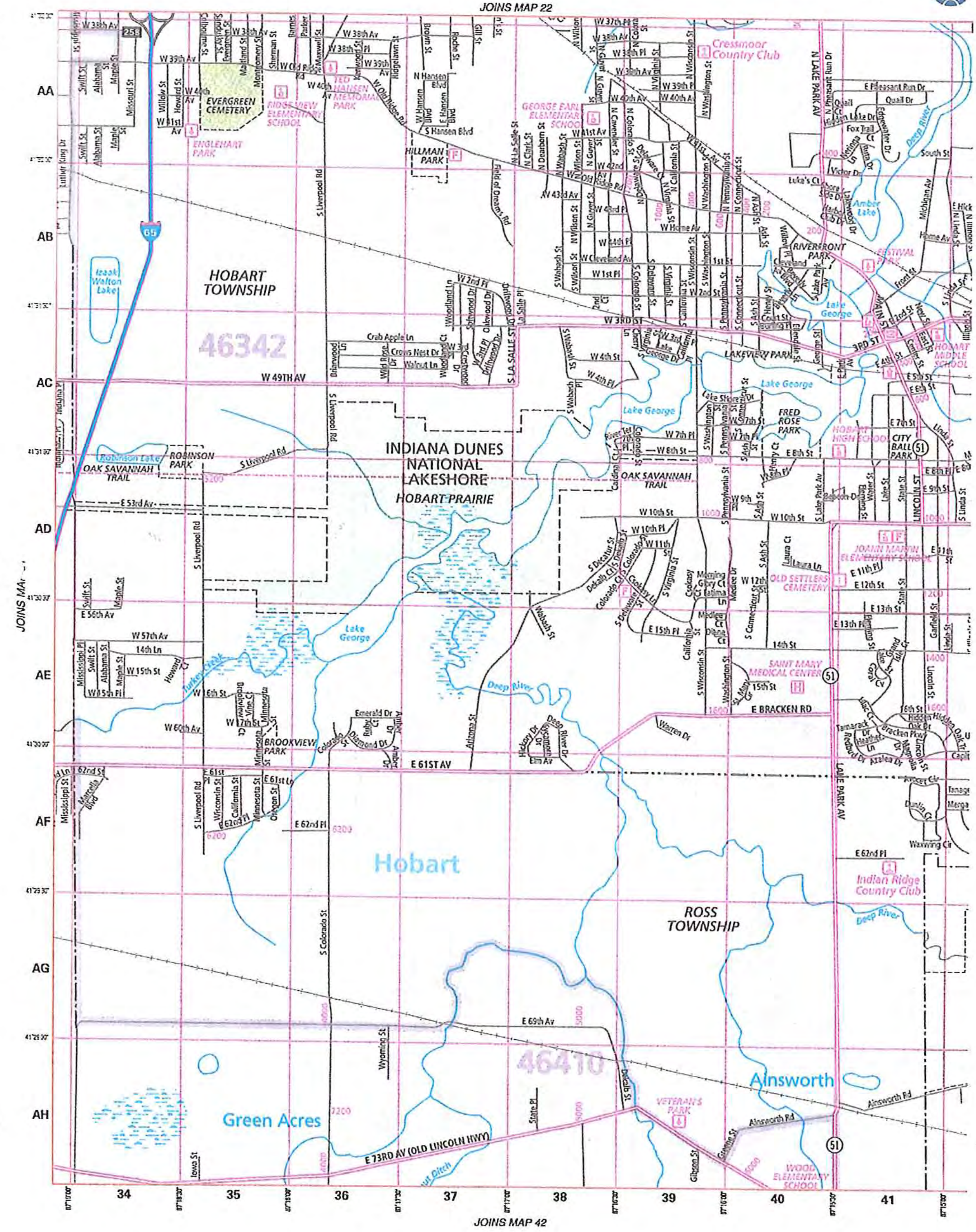

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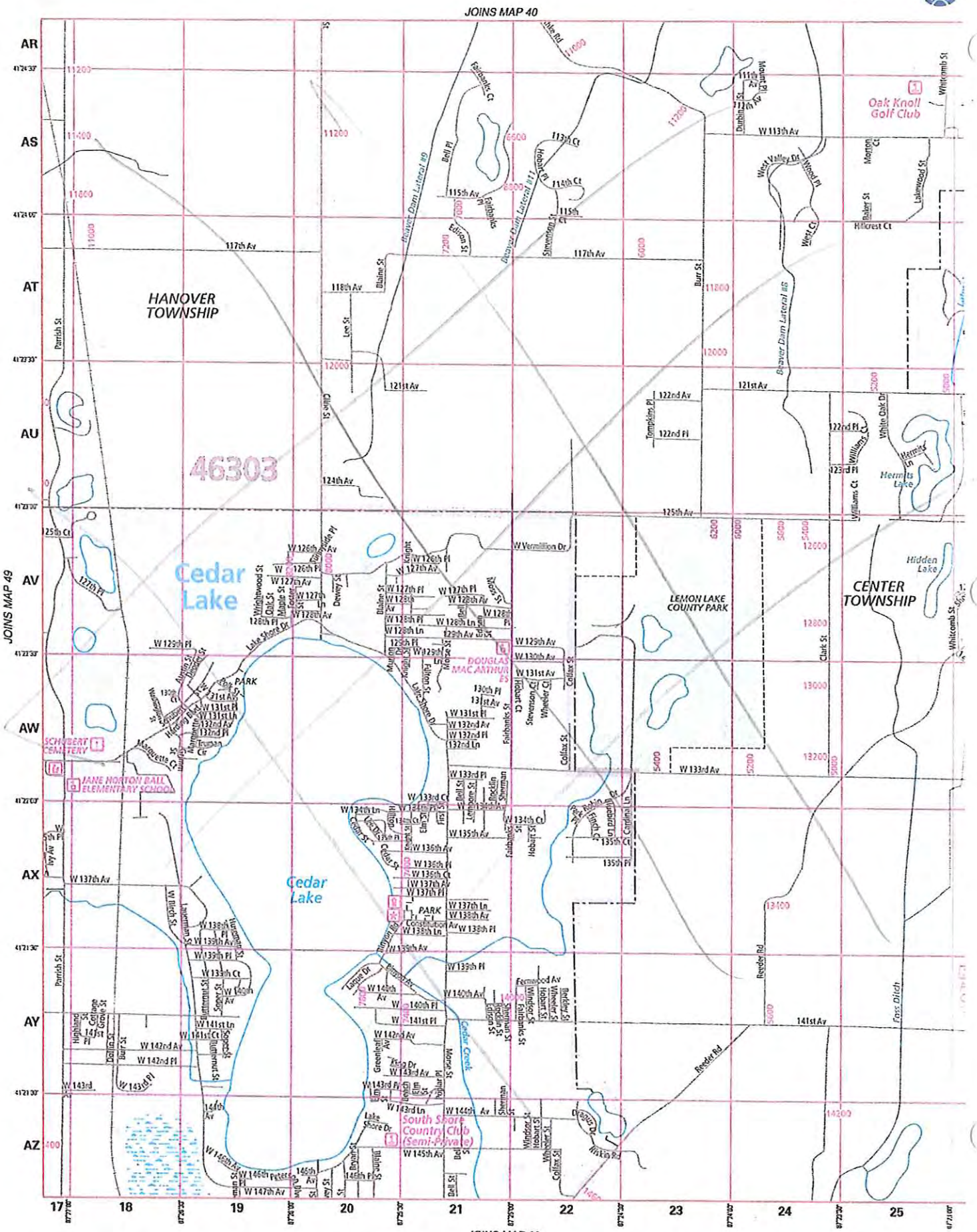


Fulton County ... **Fletcher Lake** (43 acres)
Near the intersection of CR 475 West and CR 900 South near Fletcher
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Largemouth Bass, Bluegill / Redear

Fulton County ... **Lake Manitou** (731 acres)
1 mile east of Rochester on SR 14 (second site on east side of the lake)
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Largemouth Bass, Bluegill / Redear, Crappie, Northern Pike

Fulton County ... **Nyona Lake** (104 acres)
1 mile north of Fulton on SR 25, then 5 miles east on CR 650 South
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Largemouth Bass, Bluegill / Redear, Hybrid Striped Bass

Fulton County ... **South Mud Lake** (94 acres)
4 miles northeast of Fulton at CR 675 South and CR 250 East
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Accessible areas for persons with disabilities
Largemouth Bass, Bluegill / Redear

Fulton County ... **Tippecanoe River**
Take CR 675 North, 0.5 miles west of Talma
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Smallmouth Bass, Catfish

Fulton County ... **Tippecanoe River**
3 miles north of Rochester on Old US 31 to CR 350 North to Menominee Public Fishing Area
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Smallmouth Bass, Catfish

Fulton County ... **Tippecanoe River**
Germany Bridge County on CR 375 West
Ramp – Yes, Motor – I/O, Shoreline fishing – No, Fee – No
Accessible areas for persons with disabilities
Largemouth Bass, Smallmouth Bass, Catfish

Jasper County ... **Iroquois River**
Access at SR 114 bridge in Rensselaer
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Smallmouth Bass, Catfish, Sauger

Lake County ... **Cedar Lake** (781 acres)
2 miles east of US 41 at Cline Avenue in Cedar Lake
Ramp – Yes, Motor – I/O, Fee – Yes
Largemouth Bass, Bluegill / Redear, Carp, Catfish, Hybrid Striped Bass, Yellow Perch
Cedar Lake is approximately a mile long by one-half mile wide at its broadest point. It is a shallow lake with a maximum depth of 16 feet. There is a boat launch on the north end of the lake just off Lake Shore Drive. To fish Cedar Lake, you need a boat because of the shoreline is developed.

Lake County ... **Fancher Lake** (10 acres)
In Crown Point at Lake County Fairgrounds
Ramp – Yes, Motor – Electric, Shoreline fishing – Yes, Fee – No
Accessible areas for persons with disabilities
Largemouth Bass, Bluegill / Redear, Trout
Rainbow trout are stocked in the early spring. According to the Indiana Department of Natural Resources, the maximum depth of Fancher Lake has been measured at 40 feet.

Lake County ... **Kankakee River**
LaSalle FWA; Ramp – SR 55
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee - No
Largemouth Bass, Smallmouth Bass, Bluegill / Redear, Carp, Catfish, Crappie, Northern Pike, Walleye

Lake County ... **Wolf Lake** (385 acres, Indiana / 419 acres, Illinois)
Located in Hammond
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – Yes
Accessible areas for persons with disabilities
Largemouth Bass, Bluegill / Redear, Catfish, Muskellunge, Northern Pike, Walleye
Boat ramp is access from North Calumet Avenue. The Illinois portion of the lake is broken into five smaller impoundments separated by dikes.

LaPorte County ... **Clear Lake** (106 acres
From US 35 / 39, north 1 mile on Truesdale Avenue, then 0.25 miles east
219-362-9600
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Largemouth Bass, Bluegill / Redear

LaPorte County ... **Fish Lake** (275 acres)
Off SR 4, 3.5 miles east of SR 104
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Largemouth Bass, Bluegill / Redear, Northern Pike, Walleye

LaPorte County ... **Fox Memorial Park**
Fox Park Drive & Truesdell Avenue
La Porte Parks & Recreation Department (Fox Memorial Park also includes Clear Lake)
219-326-9600
Shoreline fishing – Yes
Largemouth Bass, Bluegill / Redear

LaPorte County ... **Hog Lake** (59 acres)
2.5 miles north of Rolling Prairie on CR 700 North
Ramp – Yes, Motor – I/O, Shoreline fishing – Good, Fee – No
Accessible areas for persons with disabilities
Largemouth Bass, Bluegill / Redear, Catfish
A small out-of-the-way lake ... the property is managed by the Department of Natural Resources and offers free access.

LaPorte County ... **Kankakee River**
Off River Road, 2 miles south of Hupp Road at Kingsbury FWA
219-393-3612
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Smallmouth Bass, Catfish, Walleye

LaPorte County ... **Luhr County Park** (2 acres)
3178 South County Road 150 West
Shoreline fishing – Yes
Largemouth Bass, Bluegill / Redear

LaPorte County ... **Pine & Stone Lakes** (564 acres / 140 acres)
LaPorte, off Lake Shore Drive
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Accessible areas for persons with disabilities
Largemouth Bass, Bluegill / Redear
Pine Lake is "one lake", but is usually referenced as to "North Pine" and "South Pine" due to the intersecting peninsula.

LaPorte County ... **Soldiers Memorial Park**
Grangemouth Road & Waverly road
LaPorte Parks & Recreation Department
219-326-9600
Shoreline fishing – Yes
The park encompasses all of Stone Lake, 140 acres and all but 628 feet of shoreline. Access is available to Stone Lake, Pine Lake, Crane Lake and Craven Pond.

LaPorte County ... **Tamarack Lake** (20 acres)
At Kingsbury FWA
219-393-3612
Accessible areas for persons with disabilities
Ramp – Yes, Motor – Electric, Shoreline fishing – Yes, Fee – No
Largemouth Bass, Bluegill / Redear, Catfish

LaPorte County ... **Trail Creek** (Steelhead & Salmon)
Creek Ridge Park, 5 miles east of 421 on CR 400 North, park entrance on north side of CR 400 North
219-874-6824
Ramp – No, Shoreline fishing – Yes, Fee – No

LaPorte County ... **Trail Creek** (Steelhead & Salmon)
1 mile south of US 20 off Johnson / Wozniak Road
Ramp – No, Shoreline fishing – Yes, Fee – No

LaPorte County ... **Trail Creek US 12** (Steelhead & Salmon)
Robert Peo Public Access, 0.5 miles south of US 12 off Liberty Trail in Michigan City
Ramp – No, Shoreline fishing – Yes, Fee – No

LaPorte County ... **Trail Creek US 20** (Steelhead & Salmon)
Southeast of Michigan City on US 20, east of Johnson Road, south on US 20 bridge
Ramp – No, Shoreline fishing – Yes, Fee – No

LaPorte County ... **Trail Creek US 35** (Steelhead & Salmon)
Off US 35, on Chapala Parkway
Ramp – No, Shoreline fishing – Yes, Fee – No

Marshall County ... **Dixon Lake** (33 acres)
Southwest side of Plymouth, on Dixon Lake Trail, off Olive Trail
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Accessible areas for persons with disabilities
Largemouth Bass, Bluegill / Redear, Crappie

Marshall County ... **Koontz Lake** (346 acres)
SR 23 north to CR 700 North, then east to CR 200 East on Carlson Road
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Accessible areas for persons with disabilities
Largemouth Bass, Bluegill / Redear, Catfish

Marshall County ... **Lake of the Wood** (416 acres)
Southwest of Bremen on West Shore Drive
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Bluegill / Redear, Catfish, Crappie, Walleye

Marshall County ... **Lake Maxinkuckee** (1,854 acres)
2 miles north of SR 110 on Old SR 17
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Largemouth Bass, Smallmouth Bass, Bluegill / Redear, Catfish, Crappie, Walleye, Yellow Perch

Marshall County ... **Lake Lawrence** (61 acres)
2.5 miles south of Plymouth on Olive Trail
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Accessible areas for persons with disabilities
Largemouth Bass, Bluegill / Redear

Marshall County ... **Mill Pond Lake** (168 acres)
6 miles south of Plymouth on SR 17, 0.25 miles east of CR 12
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Accessible areas for persons with disabilities
Largemouth Bass, Bluegill / Redear

Marshall County ... **Tippecanoe River**
Off SR 331, 0.5 miles south of Old Tip Town
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Smallmouth Bass, Catfish

Newton County ...**Iroquois River**
South of Newton County Fairgrounds
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Accessible areas for persons with disabilities
Smallmouth Bass, Carp, Catfish, Northern Pike

Newton County ... **J.C. Murphy Lake** (1,100 acres)
Willow Slough FWA
219-285-2704
Ramp – Yes, Motor – Electric, Shoreline fishing – Yes, Fee – No
Accessible areas for persons with disabilities
Largemouth Bass, Bluegill / Redear, Catfish, Crappie, Northern Pike

Porter County ... **Countryside Park** (3 acres)
5250 US Highway 6 – Portage, IN 46368
Ramp – No, Shoreline fishing – Yes, Fee - Yes
Largemouth Bass, Bluegill / Redear

Porter County ... **Flint Lake**
Ramp – Yes, Fee - No
Largemouth Bass, Bluegill / Redear
Fishing by boat only.

Porter County ... **Indian Springs Park** (small pond)
West of Fire Department / Public Works Building at 550 Beam Street
Ramp – No, Shoreline fishing – Yes
Largemouth Bass, Bluegill / Redear

Porter County .... **Lake Charles Park** (small pond)
Washington & Vine Streets
Ramp – No, Shoreline fishing – Yes
Largemouth Bass, Bluegill / Redear

Porter County ... **Long Lake** (65 acres)
1 mile north of Valparaiso on West Long Lake Drive
Ramp – Yes, Motor – 10 HP, Fee – No
Largemouth Bass, Bluegill / Redear

Porter County ... **Loomis Lake** (62 acres)
Rogers Lakewood Park, 4 miles north of Valparaiso on Campbell Road

219-402-5144
Ramp – Yes, Motor – Electric, Shoreline fishing – Yes, Fee – Yes
Largemouth Bass, Bluegill / Redear, Crappie

Porter County ... **Salt Creek** (Steelhead & Salmon)
Chustak Public Access, 0.5 miles west of SR 149 on CR 600 North, northwest of Valparaiso
Ramp – No, Shoreline fishing – Yes, Fee – No

Porter County ... **Salt Creek** (Steelhead & Salmon)
Imagination Glenn County Park, 0.5 miles south of US 20 in Portage on Samuelson road, 0.25 miles east on Portage Road
Ramp – No, Shoreline fishing – Yes, Fee – No

Porter County ... **Salt Creek** (Steelhead & Salmon)
Haven Hollow Park, 7 miles south of US 20 on SR 149, 0.25 miles west of CR 700
Ramp – No, Shoreline fishing – Yes, Fee – No

Porter County ... **Salt Creek** (Steelhead & Salmon)
National Lakeshore, east branch of the Little Calumet River
Ramp – No, Shoreline fishing – Yes, Fee – No

Porter County ... **Salt Creek** (Steelhead & Salmon)
US 6, 0.25 miles east of SR 149, fishing area south of US 6 bridge
Ramp – No, Shoreline fishing – Yes, Fee – No

Porter County ... **Salt Creek** (Steelhead & Salmon)
Salt Creek PFA, CR 500 North, at McCool Road
Ramp – No, Shoreline fishing – Yes, Fee – No

Pulaski County ... **Bruce Lake** (245 acres)
6 miles east of Winamac on CR 675 East
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Accessible areas for persons with disabilities
Largemouth Bass, Bluegill / Redear, Crappie

Pulaski County ... **Tippecanoe River**
Haschell Bridge, 2.5 miles north of Winamac
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Accessible areas for persons with disabilities
Smallmouth Bass, Catfish, Northern Pike, Striped Bass

Pulaski County ... **Tippecanoe River**
Winamac City Park, east of US 35 on Main Street
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Accessible areas for persons with disabilities
Smallmouth Bass, Catfish, Northern Pike, Striped Bass

Pulaski County ... **Tippecanoe River**
1.5 miles south of Winamac off US 35
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Accessible areas for persons with disabilities
Smallmouth Bass, Catfish, Northern Pike, Striped Bass

Pulaski County ... **Tippecanoe River**
At Pulaski FWA
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No

Tippecanoe County ... **Wabash River**
2 miles north of Lafayette on Ferry Street
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Largemouth Bass, Smallmouth Bass, Catfish

Tippecanoe County ... **Wildcat Creek**
North Fork, east of Lafayette at junction of CR 200 South and CR 750 East
Ramp – No, Shoreline fishing – Yes, Fee – No
Smallmouth Bass, Catfish

White County ... **Lake Freeman** (1,547 acres)
SR 24 to Monticello, east on St. Mary's Avenue
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Largemouth Bass, Smallmouth Bass, Bluegill / Redear, Hybrid Striped Bass, Walleye, Yellow Perch

White County ... **Tippecanoe River**
North of Monticello on Francis Street to Norway Dam
Ramp – No, Shoreline fishing – Yes, Fee – No
Largemouth Bass, Smallmouth Bass, Bluegill / Redear, Hybrid Striped Bass, Walleye, Yellow Perch

Lake Michigan - Lake County ... State Line Plant (Mirant Company)
0.5 miles west of Indiana / Illinois state line, off 103rd / Ewing Avenue, south of Calumet Park in South Chicago
Ramp – No, Motor – I/O, Shoreline fishing – Yes, Fee – No
Smallmouth Bass, Carp, Catfish, Salmon, Trout, Walleye, Yellow Perch

Lake Michigan - Lake County ... Hammond Marina
Access off Indianapolis Boulevard, then 0.5 miles on Empress Avenue
219-659-7678
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – Yes
Accessible areas for persons with disabilities
Largemouth Bass, Smallmouth Bass, Bluegill / Redear, Carp, Salmon, Trout, Yellow Perch

Lake Michigan - Lake County ... Whihala Beach County Park
Whiting, access off Indianapolis Boulevard via 117th
219-659-4015
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – Yes
Accessible areas for persons with disabilities
Largemouth Bass, Smallmouth Bass, Carp, Trout, Yellow Perch

Lake Michigan - Lake County ... East Chicago Marina
East Chicago, access off Cline Avenue via Pastrick Marina / Jeorse Park, Exit 5C
219-391-8482
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – Yes
Accessible areas for persons with disabilities
Largemouth Bass, Smallmouth Bass, Bluegill / Redear, Salmon, Trout, Yellow Perch

Lake Michigan - Lake County ... Whiting Park
Access off Indianapolis Boulevard via 117th from the west access off Front Street via 117th from the east
Ramp – No, Motor – I/O, Shoreline fishing – Yes, Fee – Yes
Largemouth Bass, Smallmouth Bass, Bluegill / Redear, Salmon Trout, Yellow Perch

Lake Michigan - Porter County ... NIPSCO Station
End of Wabash Street, Michigan City at 100 West Water Street
Ramp – No, Motor – I/O, Shoreline fishing – Spring & Winter, Fee – No
Smallmouth Bass, Carp, Catfish, Salmon, Trout

Lake Michigan - Porter County ... DNR Lake Michigan Research Building

100 West Water Street in Michigan City
Ramp – No, Motor – I/O, Shoreline fishing – Yes, Fee – No
Accessible areas for persons with disabilities
Smallmouth Bass, Carp, Catfish, Salmon, Trout, Yellow Perch

Lake Michigan - Porter County ... Washington Park
0.5 miles north of US 12, off Lake Shore Drive in Michigan city
219-879-1712
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – Yes
Largemouth Bass, Smallmouth Bass, Bluegill / Redear, Carp, Catfish, Salmon, Trout, Walleye, Yellow Perch

Lake Michigan - Porter County ... Trail Creek Marina
0.5 miles south of US 12 on US 35 (Michigan City Boulevard) in Michigan City
219-879-4300
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – Yes
Largemouth Bass, Smallmouth Bass, Salmon, Trout

Lake Michigan - Porter County ... Portage Marina
0.25 miles south of US 12 off SR 249
219-763-6833
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Carp, Salmon, Trout

Lake Michigan - Porter ... Burns Ditch in Portage
Marinas along SR 249
Ramp – Yes, Motor – I/O, Shoreline fishing – Yes, Fee – No
Smallmouth Bass, Carp, Catfish, Salmon, Trout

Lake Dalecarlia Info General Information Edit Info (/lakeeditgen.php?id=$id)

Welcome to FishingNotes.com Lake Dalecarlia fishing report page. Here you will find all the information you need to make the best decisions for today's fishing. Current weather including air temperature, barometric pressure, wind speed and direction are continuously updated throughout the day. Lake Dalecarlia water temperature (/water-temperature/in/Lake-Dalecarlia) is one of the vital statistics included on this page. We also include the moon phase as full and new moons are generally better fishing times. Help in choosing what time to hit the water with daily sunrise and sunset times plus moon rise and moon set times. We would love to hear how your fishing trip went, feel free to share your days success on the community report page. Good luck and we hope you catch a full bag today!

State:	Latitude:	Maximum Depth (ft):
Indiana	41.337751	
County:	Longitude:	Normal Elevation (ft):
Lake	-87.404751	0
Inpoundment Type:	Water Clarity:	Boat Access:
Surface Area (acres):	Water Temp Factors:	Boat Limits:
0		
Lake Management:		

Lake Dalecarlia Pro Fishing Reports

Featured Guide

Guides Promote your guide service to thousands of fellow anglers for free by joining the fishingnotes.com affiliate program. Click the link bellow for more details.
Register (/guides.php)

Lake Dalecarlia Community Fishing Reports Add Report (/lakeaddrep.php?id=8905&lc=42&spec=-specid-)

Guest

2012-09-03
Species: General
Fishing Rating: 1
Water Temperature:

Good size Catfish around the 2-5 pounds are biting but at a slow rate at the south end of the lake near both dams.

Lake Dalecarlia Largemouth Bass Fishing *Hide Largemouth Bass Info*

4

Lake Dalecarlia Largemouth Bass Tips: [Add Tip] (/lakeaddfishtip.php?id=8905&spec=1)
- Try Spinner-baits

Largemouth Bass Tips for Current Conditions (automated):

[Largemouth Bass Info] (/largemouth_bass.php)
Lake Dalecarlia Largemouth Bass Rating:

With Lake Dalecarlia at 42 degree water temperature this is a great time to get out on the water and try hitting some deeper primary and secondary points. Largemouth bass will be feeding at this water temperature but will be much harder to catch. On Sunny warm afternoons its a great time to throw a crank bait, jigs or slow roll a spinnerbait at 5-10 foot on sunny points and drops off of sunny flats. Largemouth Bass will move into warm water on warm sunny days.

Lake Dalecarlia Smallmouth Bass Fishing *Hide Smallmouth Bass Info*

[Smallmouth Bass Info] (/smallmouth_bass.php)
Lake Dalecarlia Smallmouth Bass Rating:

3

Lake Dalecarlia Smallmouth Bass Tips: [Add Tip] (/lakeaddfishtip.php?id=8905&spec=2)
Smallmouth Bass Tips for Current Conditions (automated):
Smallmouth bass fishing is going to be slow with the water temperature at 42 degrees. It's time to fish deep and slow. Try some deep primary points, drop offs, and old river channels with rocks. Jigs, plastics and deep jerk baits will be your best bet to boat a smallmouth.

Lake Dalecarlia Crappie Fishing *Hide Crappie Info*

[Crappie Info] (/crappie.php)
Lake Dalecarlia Crappie Rating:

3.5

Lake Dalecarlia Crappie Tips: [Add Tip] (/lakeaddfishtip.php?id=8905&spec=3)
Crappie Tips for Current Conditions (automated):
Crappie will just be starting their migrating runs from deep river channels toward major tributaries. They will suspend in open water and channels in deep water and cover on the break lines. Crappie will stage off primary and secondary points this time of year while they are getting ready for spawn. Make sure you don?t forget the river channels, especially with structure and sharp breaks in deep water. Some crappy will hang back in this area waiting to come up to the staging areas. Drifting and slow (REALLY SLOW) trolling with jigs and other artificials work great this time of year. Always look for baitfish schools and concentrate more time when you see the bait.

Lake Dalecarlia Walleye Fishing *Hide Walleye Info*

[Walleye Info] (/walleye.php)
Lake Dalecarlia Walleye Rating:

3.5

Lake Dalecarlia Walleye Tips: [Add Tip] (/lakeaddfishtip.php?id=8905&spec=4)
Walleye Tips for Current Conditions (automated):
Walleye function very well in the colder water temperatures. Try fishing some open flats and definitely use live bait when the water temperature is this low. Plastics with scent added will also produce results, but nothing beats live bait for walleye.

Lake Dalecarlia Catfish Fishing *Hide Catfish Info*

[Catfish Info] (/catfish.php)

Lake Dalecarlia Catfish Tips: [Add Tip] (/lakeaddfishtip.php?id=8905&spec=5)
Catfish Tips for Current Conditions (automated):
The catfish family comprises of blue catfish, flathead catfish and channel catfish. Since catfish are warm water fish, they aren□t going to be very active in this water temperature. They will still be feeding, but catfish will only be

Lake Dalecarlia Catfish Rating: 4

found very deep and feeding very slowly. Your best bet is give some of the more active fish species in your lake a shot until the cats are active again.

Lake Dalecarlia Spotted Bass Fishing *Hide Spotted Bass Info*

[Spotted Bass Info] (/spotted_bass.php)
Lake Dalecarlia Spotted Bass Rating: 2

Lake Dalecarlia Spotted Bass Tips: [Add Tip] (/lakeaddfishtip.php?id=8905&spec=6)
Spotted Bass Tips for Current Conditions (automated):
Spotted bass fishing is going to be slow with the water temperature down this low. It's time to fish deep and slow. Try some deep primary points, drop offs, and old river channels with rocks. Jigs, plastics and deep jerk baits will be your best bet to boat a Spotted.

Lake Dalecarlia White Bass Fishing *Hide White Bass Info*

[White Bass Info] (/white_bass.php)
Lake Dalecarlia White Bass Rating: 2.5

Lake Dalecarlia White Bass Tips: [Add Tip] (/lakeaddfishtip.php?id=8905&spec=7)
White Bass Tips for Current Conditions (automated):

Lake Dalecarlia Striped Bass Fishing *Hide Striped Bass Info*

[Striped Bass Info] (/striped_bass.php)
Lake Dalecarlia Striped Bass Rating: 4.5

Lake Dalecarlia Striped Bass Tips: [Add Tip] (/lakeaddfishtip.php?id=8905&spec=8)
Striped Bass Tips for Current Conditions (automated):

Lake Dalecarlia Solar and Lunar Conditions

Current Lunar Fishing Tip:	Sunrise:	Sunset:	Moon Phase:
The crescent moon will have better gravitational pull than a gibbous or half moon. However the affects of the moons gravitational will be decreased since the sun and moon aren't pulling in conjunction with one another. It's time to pay close attention to the other fishing factors in the weather to make the best decision for hitting the water.	*06:18 CST*	*19:22 CST*	*% Illuminated* *Days to Full*

Lake Dalecarlia Links

Fishing (http://www.hookandbullet.com/fishing/) Tackle (http://www.hookandbullet.com/gear/)

Lake George Dam Fishing near Hobart, Indiana

SUMMARY (/FISHING-LAKE-GEORGE-DAM-HOBART-IN/) FISHING CHARTS (/FISHING-LAKE-GEORGE-DAM-HOBART-IN/BEST-FISHING-TIMES/) FISHING REPORTS (/FISHING-LAKE-GEORGE-DAM-HOBART-IN/FISHING-REPORT/) HOT SPOTS (/FISHING-LAKE-GEORGE-DAM-HOBART-IN/NEARBY-HOT-SPOTS/) NEARBY GUIDES (/FISHING-LAKE-GEORGE-DAM-HOBART-IN/TACKLE-GUIDES-CHARTERS/)

2 Fishing Reports and Edits (/fishing-lake-george-dam-hobart-in/fishing-report/)

Details for Lake George Dam

Species Caught Here:
Catfish
Green Sunfish
Carp
Bream
Bluegill
Bowfin
Drum
Largemouth Bass

Access: Public Property
Body of Water Type: Dam
Lat/Long: 41.535038 -87.258369

« Indiana Lake Finder

Cedar Lake

Lake County, Indiana

Lake Rating: 1 reviews
read reviews / add your review

Lake Details | Lake Weather | Photo Gallery | Area Events | Lake Reviews

Cedar Lake is located in Lake County, Indiana. This lake is 781 acres in size. Anglers can expect to catch a variety of fish including Bluegill, Carp, Channel Catfish, Hybrid Striped Bass, Largemouth Bass and White Crappie.

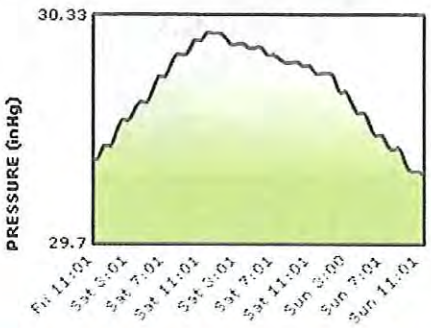
Current Weather Conditions

42°F
Overcast

Wind:	S @ 16.1 mph	Visibility:	10.0 mi
Humidity:	59.0%	Dewpoint:	28.2°
Sunrise:	6:17:02 AM	Pressure:	29.89"
Sunset:	7:26:05 PM		

Last update 4/10/16 @ 11:41 AM CST

36 Hour Barometric Pressure Trend



Learn about the effects of barometric pressure and fishing.

Sunrise/Sunset Times

	SUNRISE	SUNSET
Today:	6:16:51 AM	7:25:30 PM
Tomorrow:	6:15:15 AM	7:26:34 PM

General Information

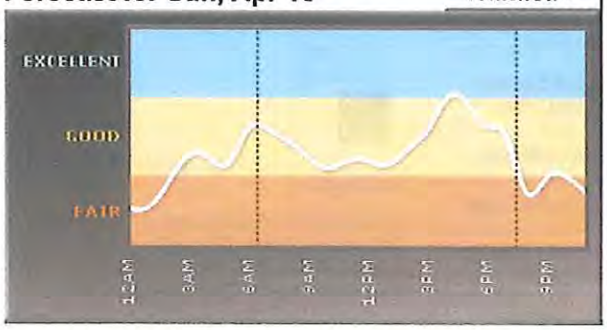
County: Lake County
State: Indiana
Acres: 781 square acres
Elevation: 693 feet
Access: No ramp
Shore Fishing: good

Fish Species: Bluegill
Carp
Channel Catfish
Hybrid Striped Bass
Largemouth Bass
White Crappie

Cedar Lake Fishing Forecast

Lake-Link's Fishing Forecast is based on solar and lunar influences that cycle during each day. Learn more about Lake-Link's Fishing Forecasts.

Forecast for Sun, Apr 10 Tomorrow >



Lake-Link Members have acesss to extended fishing forecasts
Lake-Link members can access fishing forecasts up to 10 days in advance. Perfect for getting the most out of your time on the water.
Click here for Membership Info.

Home

Parks

- Buckley Homestead
- Cedar Creek Family Golf Center
- Deep River and Deep River Waterpark
- Gibson Woods Nature Preserve
- Grand Kankakee Marsh
- Lake Etta and Lake Etta Banquet Hall and Wedding Pergola
- Lemon Lake
- Oak Ridge Prairie & Oak Savannah Trail
- Stoney Run
- Three Rivers and Bellaboo's Play and Discovery Center
- Turkey Creek Golf Course & Banquet on the Green
- Whihala Beach

Activities

Education

Info and Fees

Also visit:

Bellaboo's Play and Discovery Center

Deep River Waterpark

Turkey Creek Golf Course

Conway Observatory and CAS web link

Click here for 2016 calendar

PROGRAMS ARE SUBJECT TO CHANGES CHECK FOR UPDATES

HELP KEEP US GREEN - Save paper and mailing. Email info@lakecountyparks.com and ask to be removed from the hard copy mailing list. Click on Pathfinder Cover instead.

Stoney Run County Park

Produced by MAP Video Productions

Stoney Run County Park
9230 E. 142nd Avenue, Hebron, IN 46341
Park open 7 a.m. - sunset year round

Directions to Stoney Run County Park

Exit Interstate 65 east at Route 231 Hebron/Crown Point exit. Travel east toward Hebron for about 4.5 miles to Leroy and turn left at 145th Avenue. The Korean Memorial is on your left. Continue past it on 145th for 2.5 miles to the park.

GPS: 41.359999,-87.225063

Click here for a Map of Stoney Run County Park
Click here for a Map of Stoney Run Equestrian Trail
Click here for a Map of Stoney Run Trails
Click here for a Map of Stoney Run Shelters

Welcome to Stoney Run

Dedicated in 1973, Stoney Run is nestled in the rural setting of southeast Lake County. The 316 acres of tranquil woodlands, ponds, and open meadows lend themselves to a peaceful experience. The eight miles of hiking trails let visitors get away from it all and enjoy nature at its finest, observing first hand the interrelationship between flora and fauna in the heavily wooded oak hickory forest. Stoney Run's primarily level terrain is complemented by a ravine running through the eastern half of the park and rolling hills on the western side, providing for a great variety of wildflowers. The park is open 7 a.m. to sunset year round.

Vietnam Veterans Memorial

Special services on Memorial Day at 2:30 p.m. and the Saturday prior to Veterans Day at 10:30 p.m. presented by the Vietnam Veterans Memorial Committee. Click here for service information and the history of the Memorial.

Banquet on the Green
at Turkey Creek Golf Course

Call us at 219-887-3550
for menu selections and reservations

Lake Etta Banquet Hall

Call 219-949-6533

Trails

Self-guided hiking trail past red and black oaks, shagbark and pignut hickory. Found growing in the sunlight along the forest edge are spice bush, elderberry, grape and sumac. Spring wildflowers are abundant and deer, squirrel, rabbit and a variety of birds are often seen while hiking the interior and perimeter trails. Approximately 8 miles of trails meander through the park. Riders, providing their own horses, will enjoy the remote areas of the park. Riders must stay on the perimeter trail and keep horses out of the picnic area and all turf areas.

Cross Country Skiing

The hiking trails and perimeter trail are groomed during the winter months for cross county skiing. Rentals are available when weather conditions permit. Cross country ski rental.

Other Great Features of Stoney Run

- Great creative playgrounds
- Picnic shelters
- Barbeque grills
- Barrier free toilets
- Equestrails may use the perimeter trail only. Park trailers in the campground area. Restricted to April-Dec. Watch for trail conditions after heavy rain.
- Fishing lake
- Volleyball standards
- Hiking trails
- Open play fields
- Recreational equipment.
- Primitive camping for not-for-profit groups only by reservation

For reservations and more information about the Lake County Parks Call 219-769-PARK
Mon-Fri 8:30am to 4:30pm Central Time (Chicago Time)

Lake County Parks and Recreation Department Corporate Office
8411 East Lincoln Highway, Crown Point, Indiana 46307
Just west of Deep River WaterparK 4.5 miles east of I-65 on Route 30

Home | Internships | Employment | Volunteer | Contact Us

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  - Gibson Woods Nature Preserve
  - Grand Kankakee Marsh
  - Lake Etta and Lake Etta Banquet Hall and Wedding Pergola
  - Lemon Lake
  - Oak Ridge Prairie & Oak Savannah Trail
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Also visit:

Bellaboo's Play and Discovery Center

Deep River Waterpark

Turkey Creek Golf Course

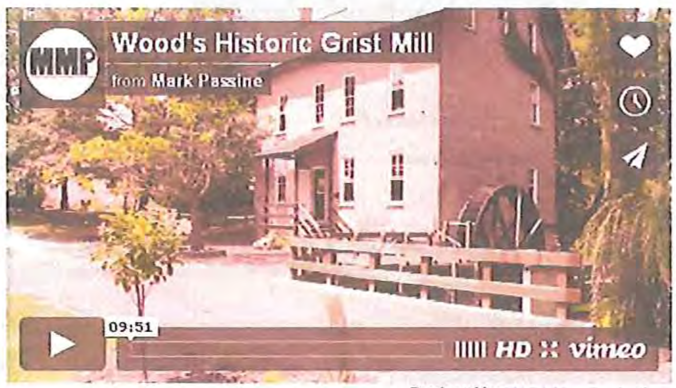
Conway Observatory and CAS web link

Click here for 2016 calendar

PROGRAMS ARE SUBJECT TO CHANGES CHECK FOR UPDATES

HELP KEEP US GREEN! Save [illegible] Email info@lakecountyparks.com and ask [illegible]

Deep River County Park



Produced by [illegible]

Deep River County Park Wood's Historic Grist Mill area: 9410 Old Lincoln Highway - Hobart, Indiana 46342
Park open 7 a.m. - dusk, all year round
Visitor Center General Store and Wood's Historic Grist Mill (May-Oct) 219-947-1958
Park maintenance 219-942-6710

Deep River County Park Big Maple Lake area: 7302 Ainsworth Road, Hobart, IN 46342

Deep River Waterpark: 9001 East U.S. Highway 30 (4.5 miles east of I-65 on Rt. 30)
Open Memorial Day through Labor Day (closed weekdays the end of August)
219-947-7850

CLICK HERE FOR "WOOD'S GRIST MILL - LAKE COUNTY'S FIRST INDUSTRY"

CLICK HERE FOR WOOD'S HISTORIC GRIST MILL BROCHURE

Directions to Deep River County Park

For the park's historic area travel U.S. 30 to Grand Blvd (Rt. 51) then north to the first stop sign (Old Lincoln Highway). Turn right (east) onto Old Lincoln Highway then 2&1/2 miles to the park. Located at intersection of Old Lincoln Highway and (Lake and Porter) County Line Road.

For Big Maple Lake area: From I-65 and Rt. 30 travel east about 4 miles to Grand Blvd (US 51) then north 1.2 miles to Ainsworth Road (just north of the train tracks) then east for ½ mile. Entrance is on the left.

GPS:

Deep River Wood's Grist Mill: 41.475944,-87.222285

Deep River County Line Road picnic area: 41.483097,-87.22008

Big Maple Lake area: 41.491101, -87.248872

Deep River Waterpark: 41.47063,-87.230138

View Larger Map

Click here for a map of Deep River Equestrian Trail

Welcome to Deep River Park

At the mention of Lake County Indiana many think of the steel mills and sprawling refineries. But the landscape was far from that when John Wood first arrived in the county in 1835. Then the area was one of virgin forests, rolling prairies and impenetrable swamps. It was a far cry from the Massachusetts he had left. Lake County was still the American frontier, while the area around Danvers, MA, Wood's hometown, was developing into one of the nation's major industrial areas.

John Wood traveled back east for his family and upon his return to Lake County in 1837, built a simple up and down sawmill on the banks of Deep River. The following year he constructed a grist mill. These two operations represent the first industrial complex in Lake County. While there's a big difference between a simple sawmill and a roaring blast furnace, both represent the technology and industry of their respective times. And, they both accomplish the same task -- taking raw materials and turning them into useful products on a large scale.

Today, Deep River County Park encompasses more than 1,200 acres on both the south and north sides of U.S. Highway 30 about 4.5 miles east of Interstate 65 in Merrillville. Deep River Waterpark is located on the south area of the park site..

The historic area of the serene park stretches along the Deep River corridor for about four miles with trails beginning behind the Historic Wood's Grist Mill. The original wood frame structure was later rebuilt of brick in 1876 by Nathan Wood, John's son, as a custom flouring mill. That's the building you see today.

The Lake County Parks and Recreation Board acquired the site and renovated the mill, which was listed on the National Register of Historic Places on October 10, 1975. Renovated in 1976, Wood's Mill is surrounded by gardens, a wedding gazebo, a visitor center, and Grinder Field, home of the Deep River Grinders historic base ball team.

Wood's Grist Mill stands as a reminder of the great industrial strength of Northwest Indiana. Today

corn meal is ground using the large mill stones from May through October (days and times vary).

Next door, the Deep River Visitor Center, housed in the remains of a 1904 church, offers a variety of specialty items and hand made crafts. Deep River's own pure maple syrup is available during Maple Syrup Time during the first of March each year.

The nature trails along the river connect the historic areas of the park with a picnic area on County Line Road and, further north, the sulky track area and across Ainsworth Road the overlook and Big Maple Lake. Many of these areas provide a picturesque view of woods and natural habitat.

Other Great Features of Deep River Park

- Barbeque facilities
- barrier free toilet
- Children's summer programs
- Cross country ski trails (no rentals)
- Fishing (Indiana waters)
- General Store (May-October)
- Hayrides (tractor driven, September and October)
- Hiking trails
- Historical buildings
- Horseback riding (no rentals and not in historic area)
- Interpretative staff
- Open play fields
- Picnic shelters
- Picnic tables
- Playground
- Recreational equipment rental
- Sand volleyball at Waterpark
- Toilets (flush)
- Toilets (pit)
- Full service WATERPARK
- Volleyball standards

AIR CURRENTS / WIND

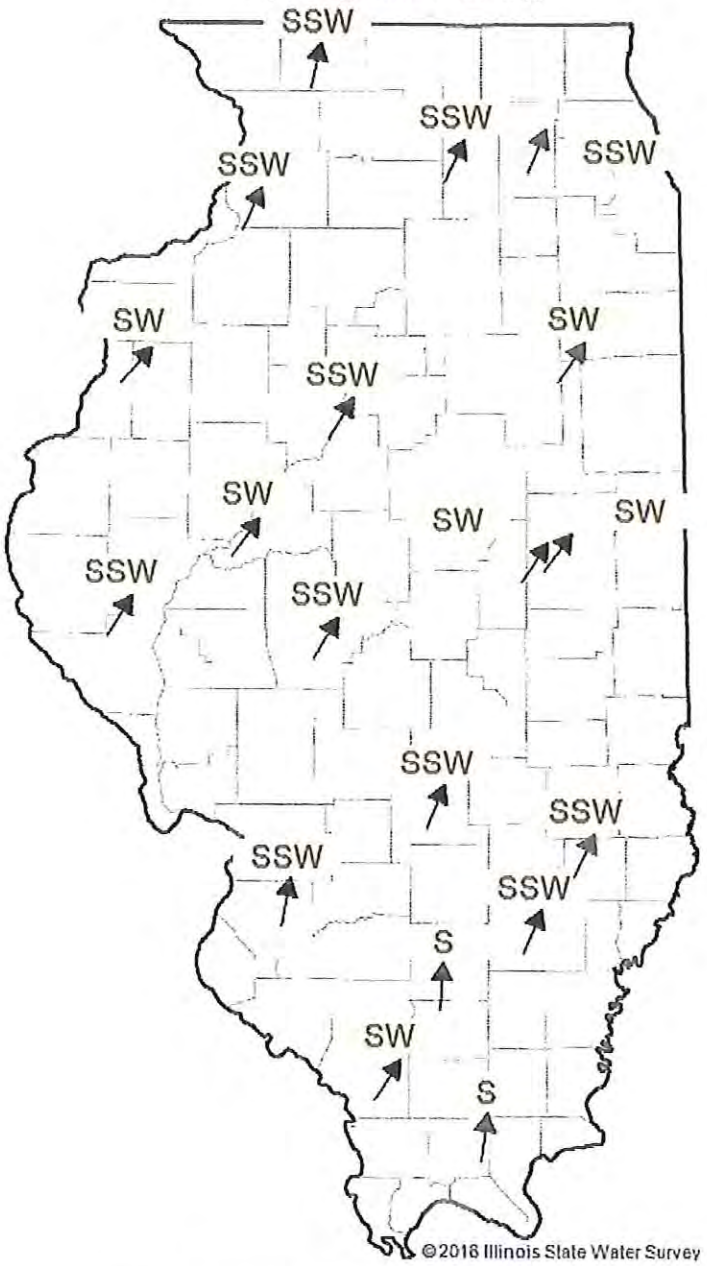
Considering the proposed location, scope of project and shape combined with geographic location, the natural prevailing winds and seasonal air currents, everyone within hundreds of miles will be affected in some adverse way. If the intention is to reduce traffic and pollution and hazards to the Chicago metropolitan area, then the project is a complete failure. By simply checking my weather vane (on top of my barn) and researching past air currents, I would say 80% or more of the pollution and dangers related to an incident will greatly affect every community negatively from my area to and beyond Chicago, the very people it is supposed to benefit (see attached air current maps).

VINCENT KUZNICKI
340 S. 350W
VALPO. IN. 46385

219 · 242 · 4751

April 3, 2016

Daily Average Wind Direction (°)



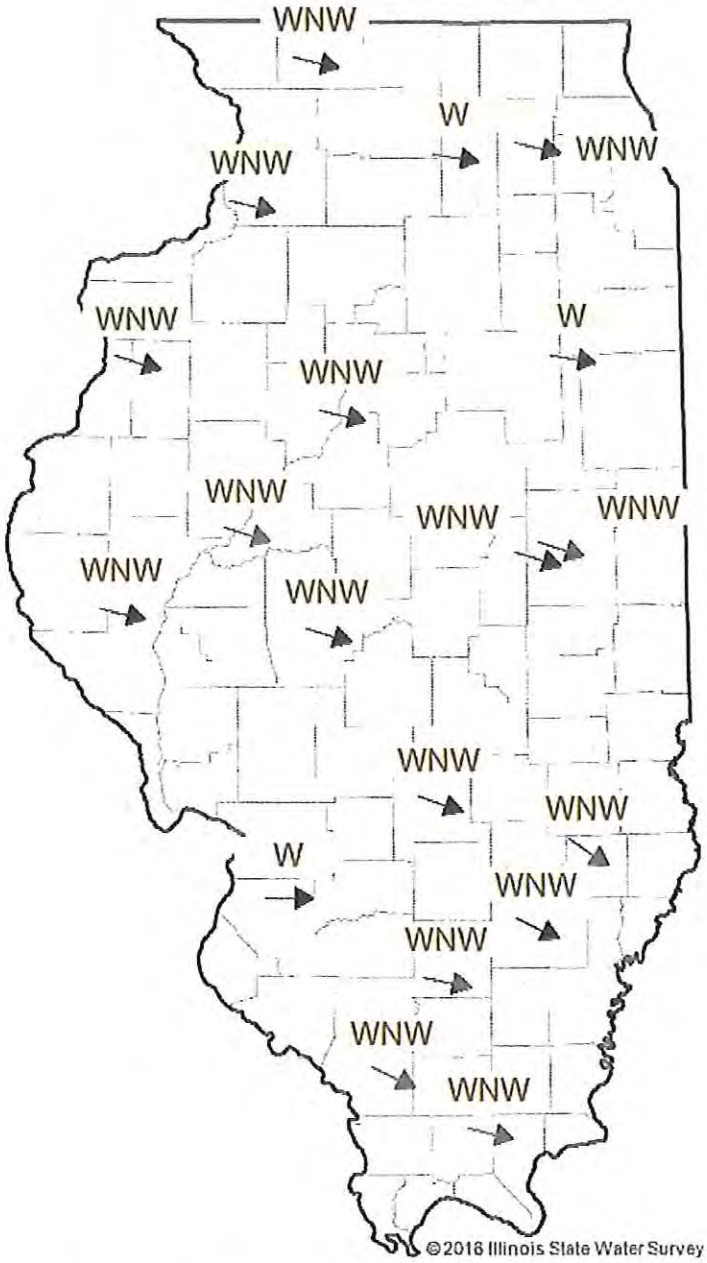
Date: 4/3/2016 Show

Previous day Next day

Station	County	Daily Average Wind Direction (°)
Belleville	St. Claire	**192**
Big Bend	Whiteside	**205**
Bondville	Champaign	**214**
Brownstown	Fayette	**204**
Carbondale	Jackson	**214**
Champaign	Champaign	**216**
DeKalb	DeKalb	**207**

April 2, 2016

Daily Average Wind Direction (°)



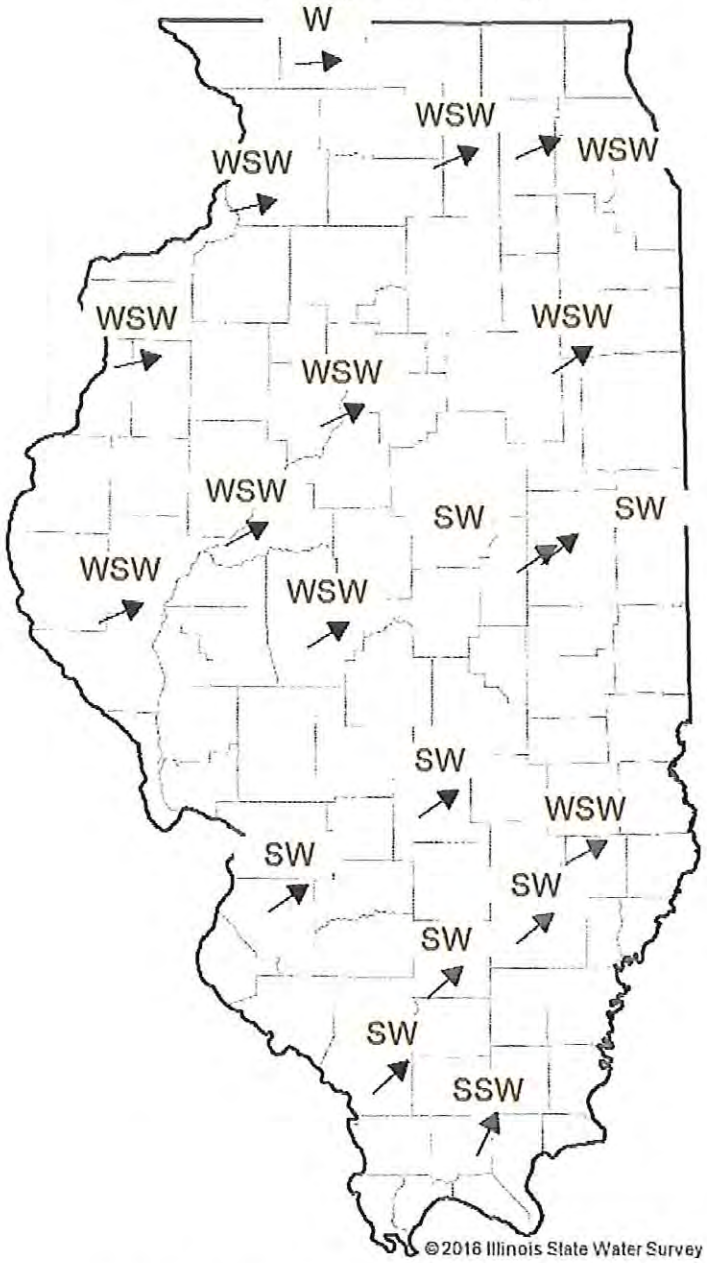
Date: 4/2/2016 Show

Previous day Next day

Station	County	Daily Average Wind Direction (°)
Belleville	St. Claire	**269**
Big Bend	Whiteside	**284**
Bondville	Champaign	**288**
Brownstown	Fayette	**289**
Carbondale	Jackson	**297**
Champaign	Champaign	**288**
DeKalb	DeKalb	**279**

March 31, 2016

Daily Average Wind Direction (°)



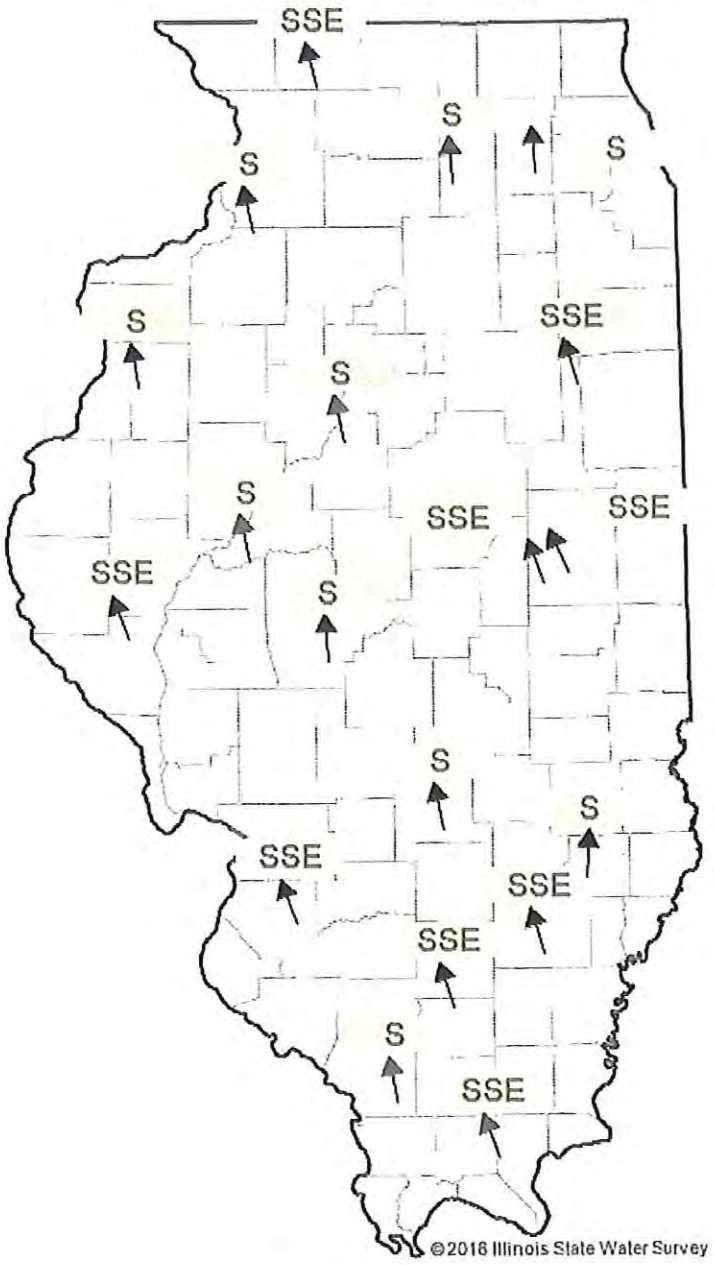
Date: 3/31/2016 Show

Previous day Next day

Station	County	Daily Average Wind Direction (°)
Belleville	St. Claire	**236**
Big Bend	Whiteside	**257**
Bondville	Champaign	**235**
Brownstown	Fayette	**236**
Carbondale	Jackson	**228**
Champaign	Champaign	**231**
DeKalb	DeKalb	**248**

March 30, 2016

Daily Average Wind Direction (°)



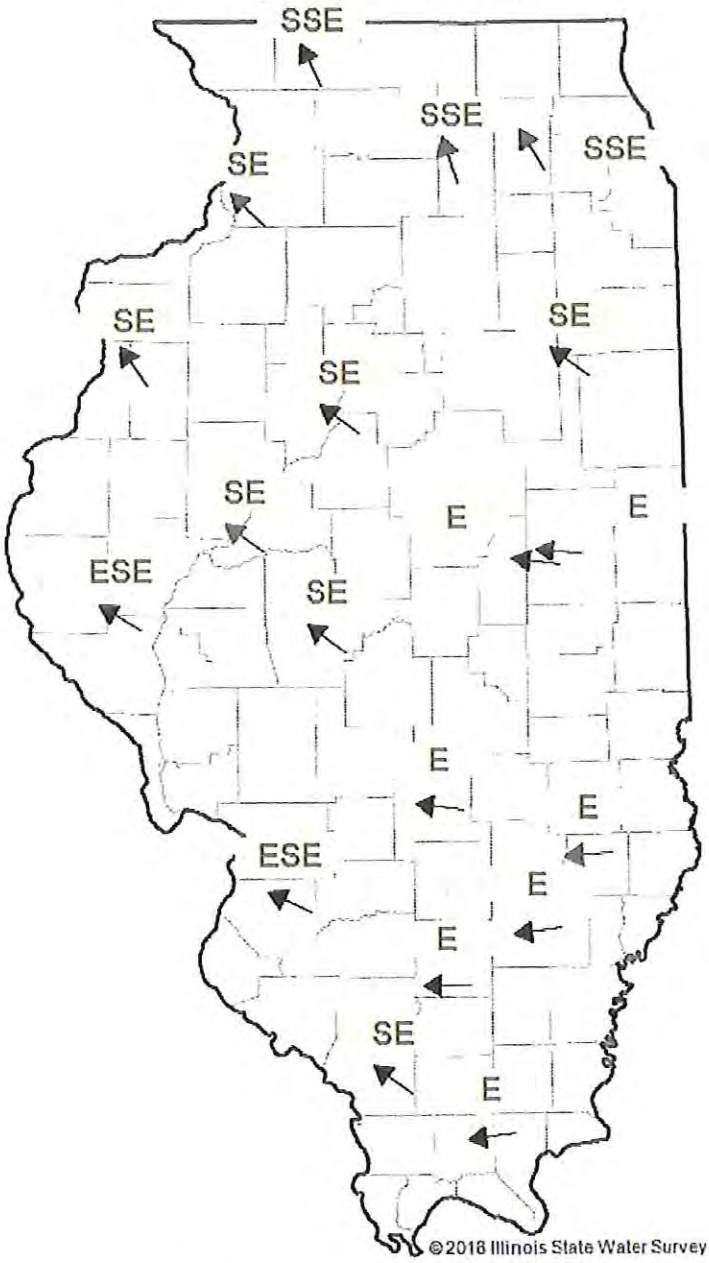
Date: Show

Previous day | Next day

Station	County	Daily Average Wind Direction (°)
Belleville	St. Claire	161
Big Bend	Whiteside	169
Bondville	Champaign	159
Brownstown	Fayette	169
Carbondale	Jackson	171
Champaign	Champaign	158
DeKalb	DeKalb	175

March 29, 2016

Daily Average Wind Direction (°)



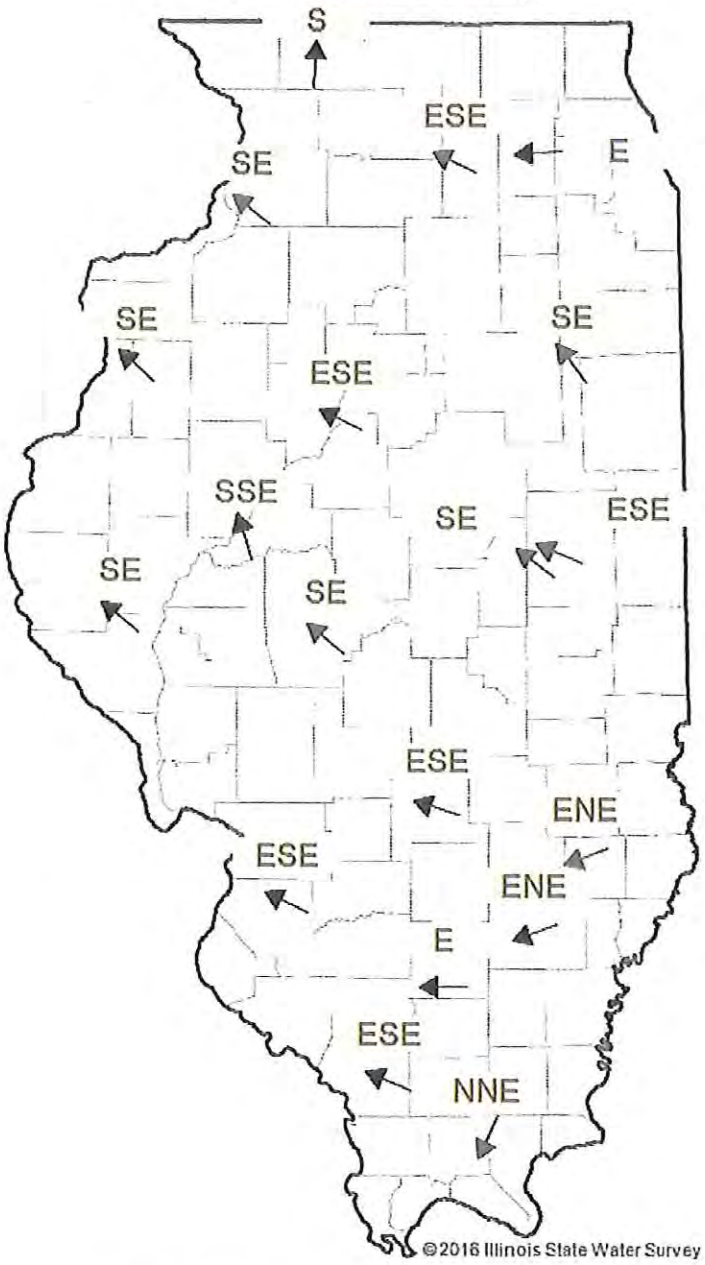
Date: 3/29/2016 Show

Previous day Next day

Station	County	Daily Average Wind Direction (°)
Belleville	St. Claire	117
Big Bend	Whiteside	135
Bondville	Champaign	99
Brownstown	Fayette	97
Carbondale	Jackson	127
Champaign	Champaign	96
DeKalb	DeKalb	163

December 25, 2015

Daily Average Wind Direction (°)



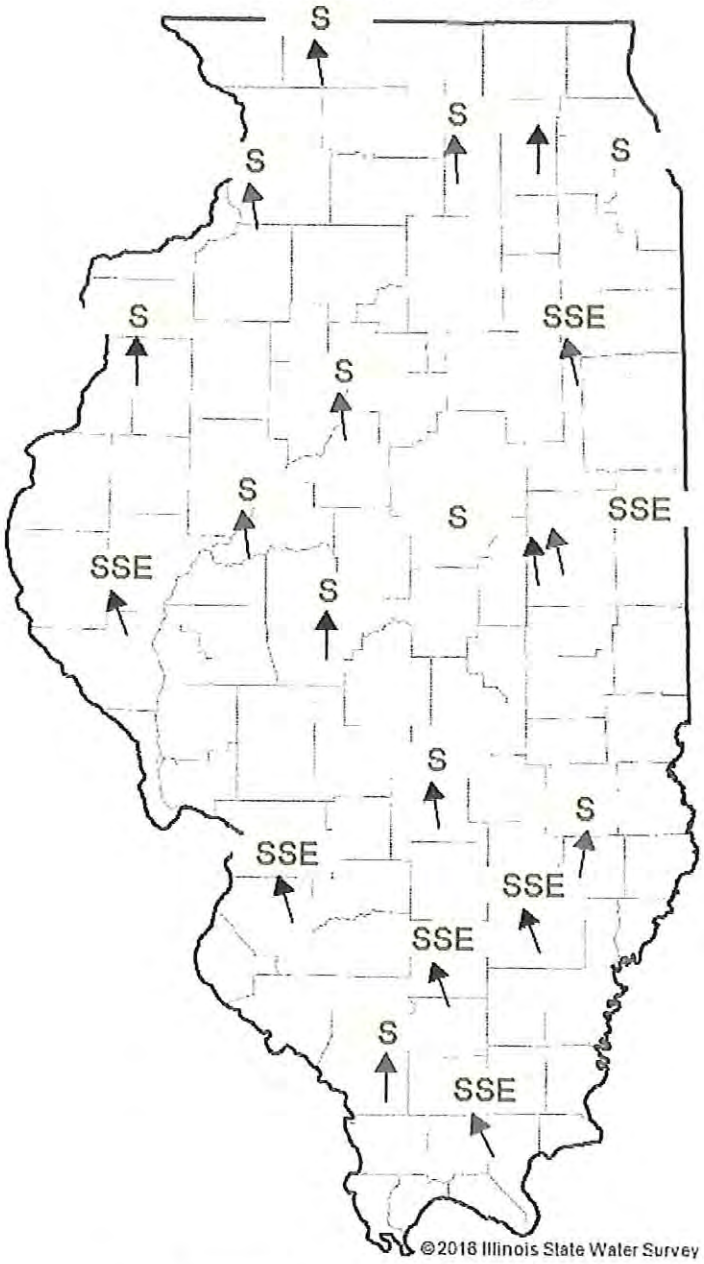
Date: 12/25/2015 Show

Previous day Next day

Station	County	Daily Average Wind Direction (°)
Belleville	St. Claire	**117**
Big Bend	Whiteside	**130**
Bondville	Champaign	**128**
Brownstown	Fayette	**107**
Carbondale	Jackson	**113**
Champaign	Champaign	**112**
DeKalb	DeKalb	**117**

September 17, 2015

Daily Average Wind Direction (°)



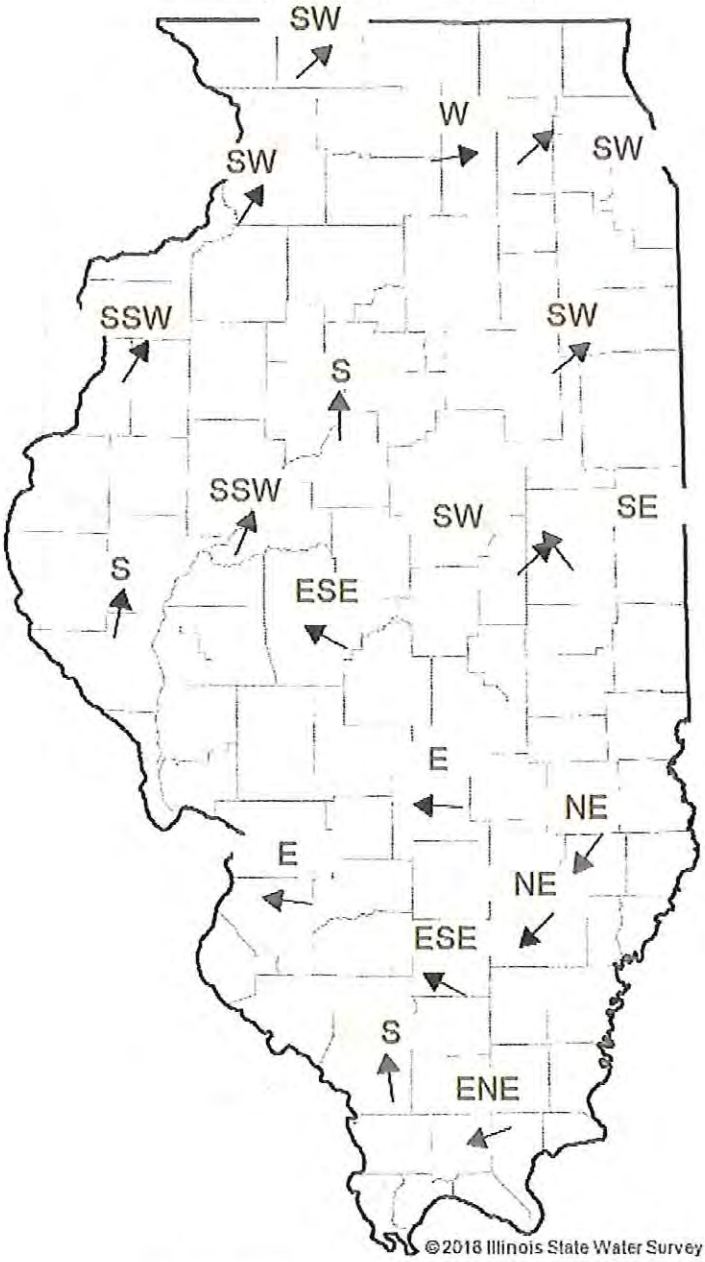
Date: 9/17/2015 Show

Previous day Next day

Station	County	Daily Average Wind Direction (°)
Belleville	St. Claire	**163**
Big Bend	Whiteside	**171**
Bondville	Champaign	**173**
Brownstown	Fayette	**171**
Carbondale	Jackson	**181**
Champaign	Champaign	**166**
DeKalb	DeKalb	**175**

July 4, 2015

Daily Average Wind Direction (°)



Date: 7/4/2015 Show

Previous day Next day

Station	County	Daily Average Wind Direction (°)
Belleville	St. Claire	99
Big Bend	Whiteside	214
Bondville	Champaign	229
Brownstown	Fayette	94
Carbondale	Jackson	174
Champaign	Champaign	144
DeKalb	DeKalb	261