

Concerning Proposed Construction of Heavy Industry Near Schools

Consider Policy 6200, School Buildings and Sites (from Title 126, Legislative Rule, Series 172), as found on the West Virginia Department of Education website (wvde.state.wv.us/policies/).

Section 202.06 states:

*For the safety of students, **the [school] site shall be located away from hazards and undesirable environments, such as:***

- a. Railroads, arterial highways, heavily traveled streets, traffic and congestion*
- b. Noise, toxic gas escapes from railroads, airports, and **odoriferous plants or industries***
- c. Natural barriers limiting accessibility and expandability, such as rivers, lakes, swamps, and protruding ridges*
- d. High voltage transmission lines, booster or reduction stations, **high pressure gas lines**, and transformer stations*
- e. Taverns, fire stations, bulk storage plants for flammable liquid, and **property zoned as industrial***

By definition, a legislative rule is an administrative rule that has been adopted by a government agency, and it has the force of law. Obviously, Section 202.06 was written with the intention of keeping West Virginia's school children out of harm's way. There need not be any confusion whether it implies heavy industry should not be located near a school.

Basically, Section 202.6 states that if heavy industry, then no school. It is a simple case of *modus tollens* that if a school is being built, then no heavy industry is near (justified via truth table below), and so it is within reason to believe that after a local board of education has gone through all the work of finding an appropriate piece of land in compliance with Section 202.06, no one should be allowed to come along and rezone the property across the street in order to construct heavy industry.

Let H and S be defined as follows:

H: heavy industry
S: school

Basically, Section 202.6 states that *if H, then not S*.

Using the symbols of truth tables, an arrow (\rightarrow) is used for logical implication, connecting an antecedent with a conclusion. A squiggly line (\sim) is used for negation.

Therefore, we have the following meanings:

$\sim S$: no school
H $\rightarrow \sim S$: if heavy industry, then no school

Therefore, Section 202.6, again, can be written $H \rightarrow \sim S$.

Note that in general, a statement of logical implication is true in every case EXCEPT when the antecedent (in our case, H) is true and the conclusion (in our case, $\sim S$) is false.

Now, in determining whether heavy industry can exist near a school, we need to first state the two truths, that 1) we have a policy already stating that if heavy industry exists then school cannot exist (written $H \rightarrow \sim S$), **and** 2) a school exists (written S).

Using the symbols of truth tables, an upside-down V (\wedge) is used for the connector word "and".

Note that in general, a compound statement using "and" is true if and only if both simple statements are true.

Basically, we need to construct a truth table to arrive at the truth values for the following argument:

$$[(H \rightarrow \sim S) \wedge S] \rightarrow \sim H$$

translated

[(if heavy industry leads to no school) and there is a school] then no heavy industry can exist

H	S	$\sim S$	$H \rightarrow \sim S$	$(H \rightarrow \sim S) \wedge S$	$\sim H$	$[(H \rightarrow \sim S) \wedge S] \rightarrow \sim H$
True	True	False	False	False	False	True
True	False	True	True	False	False	True
False	True	False	True	True	True	True
False	False	True	True	False	True	True

The fact that the last column shows "True" for all situations means that we have a valid argument, that no heavy industry can exist near a school.

Stated another way, we have the question, is Section 202.6 ($H \rightarrow \sim S$) logically equivalent to the argument that if a school exists, then heavy industry cannot exist ($S \rightarrow \sim H$)? The answer is yes, as they are contrapositives, as again shown using a truth table.

H	S	$\sim H$	$\sim S$	$H \rightarrow \sim S$	$S \rightarrow \sim H$	$(H \rightarrow \sim S) \rightarrow (S \rightarrow \sim H)$
True	True	False	False	False	False	True
True	False	False	True	True	True	True
False	True	True	False	True	True	True
False	False	True	True	True	True	True