ONTARIO LABOUR RELATIONS BOARD

2642-11-HS IBEW Local 530, Applicant v. **Gil & Sons Limited** and Fil Savoia, Regional Director, Responding Party v. First Solar Development (Canada) Inc., Intervenor.

BEFORE: Ian Anderson, Vice-Chair.

APPEARANCES: Ron Lebi and Mick Cataford appearing for the applicant; John Salisbury appearing for Gil & Sons Limited; Steven Succi, Brian Fukuzawa, Juan Clavijo, Wayne De L'Orme and Robert Wrigley appearing for the Regional Director; John Illingworth, Peter Carrie and Tom Kosnik appearing for the intervenor.

DECISION OF THE BOARD: March 30, 2012

1. This is an appeal under section 61 of the *Occupational Health and Safety Act.*

2. The issue in this appeal is whether the receptacle portion of an "MC4 Plug In Connector" is a "convenience receptacle" within the meaning of section 182 of the "Construction Projects" regulation (O. Reg. 213/91, as amended) under the Act (the "Regulation"). If it is not, then only a certified electrician or apprentice electrician may connect an MC4 Connector. Juan Clavijo, an Inspector under the Act, determined that the work did not have to be performed by a certified electrician or apprentice electrician. IBEW Local 530 appeals from this determination.

3. Having regard to paragraph 4 of section 61(2), the style of cause is corrected by deleting "Juan Clavijo, Inspector" as a party and substituting "Fil Savoia, Regional Director".

4. This matter was heard by means of a consultation process, as contemplated by Rule 41 of the Board's Rules of Procedure. As a result, the hearing was completed in one day. There were no disputes with respect to almost all of the facts upon which any party sought to rely. There were a few facts which initially appeared to be in dispute. Those disputes were resolved through discussions between the parties mediated by the Board. At the conclusion of this process there were no material facts in dispute and no need to hear evidence.

5. I note that while a representative appeared on behalf of Gil and Sons Limited, at the outset of the hearing he indicated that he did not intend to make any representations on its behalf.

The Facts

6. First Solar Development (Canada) Inc. was the constructor of a solar energy power generation project in Mooretown, Ontario (the project has now been completed). Such projects are sometimes referred to as "solar farms". Gil & Sons was a contractor on the site. Gil & Sons has a collective agreement with the IBEW. The IBEW referred a "permit worker" to the site to perform work for Gil & Sons. The permit worker was not a certified electrician or apprentice electrician. An incident occurred on October 25, 2011 involving the permit worker, which is described in greater detail below. First, however, it is useful to describe the nature of the solar farm and the work being performed by the permit worker.

7. A solar farm consists of one or more arrays of photovoltaic panels supported by a system of racks (which First Solar refers to as "tables"). Prefabricated photovoltaic modules are brought to the site. They are mounted upon racks which have been assembled on site. Each module has two cables attached to it, referred to as "flying leads". There is a positive flying lead and a negative flying lead.

8. The flying leads consist of a single multi-strand copper wire, with two coatings: around the wire is an insulator; around the insulator is a weatherproof cover. The cable is rated to 1,000 volts. The positive flying lead terminates in a plug; the negative flying lead terminates in a receptacle. The plug on the end of the positive flying lead consists of a metal pin encased in a housing. The receptacle for the pin on the end of the negative flying lead is also made of metal and also encased in a housing. It is not possible to touch either the metal pin or the metal receptacle: they are "finger safe". The receptacle on the negative flying lead from one module will receive the plug on the positive flying lead from the adjacent module, that is, the plug is inserted into the receptacle.

9. Collectively, the plug and receptacle at the end of the flying leads are known as an MC4 Plug In Connector (First Solar also refers to them as a "PV Module Plug and Play" connector). The MC4 Connector was specifically developed for the photovoltaic industry: it is the standard connector for photovoltaic panels used worldwide in the solar panel industry. They may be purchased by consumers at retail building supply stores for the purposes of home installation.

10. The plugs and receptacles of MC4 Connectors are designed in such a way that when a plug is inserted into a receptacle they lock together with an audible clicking sound. A special tool is required to unlock them. The plugs bear a printed warning which reads: "Do not disconnect under load". The term load means that there is current flowing through the cable. Both the locking feature and the notice are prescribed by the *Canadian Electrical Code*. Once connected, an MC4 Connector is rated as safe if immersed in water. There is also a sleeve that goes over the MC4 Connector after the ends have been connected.

11. On this project, the racks supported four rows of modules arranged so that from above the modules appear to be in columns. Nine modules in a row were connected to each other in series to form a "string", which is also sometimes referred to as a "panel". An "array" of four rows by nine columns was created by connecting four strings in parallel: the negative flying leads at the end of each string were connected to a harness. The harness is a cable (with the same characteristics as the cables which make up the flying leads) with 4 "T fittings". Each T fitting terminates in a plug that is the same as the plugs on the positive flying leads. Those plugs were inserted into the receptacles on the negative flying leads at the end of each string.

12. It is the nature of a solar module that once it is exposed to light it becomes an electrical device generating Direct Current, or DC, electricity. The modules used in this project each generate up to between 48 and 56 volts of DC electricity. Since a string consisted of nine modules linked up in series, the string generated nine times the amount of electricity as a single module, i.e. between 432 and 504 volts. Since the strings in an array were connected in parallel, the overall voltage of the array remained the same as a string: 432 to 504 volts.

13. The harnesses from the arrays go to a "jumper". The jumpers go to a combiner box which combines them all together. That work involves stripping cable and a screw driver: it is not the work which is the subject of this appeal. For completeness I note that from the combiner the power goes to a converter. The converter converts the power from DC to Alternating Current, or AC.

14. This project was designed so that there would be four arrays. It is important to note that there is no separation between the arrays. That is, there are 36 modules in a row on the rack with no greater physical separation between, for example, the eight and ninth module which were to complete one string and the tenth module which was to commence the next string.

15. On October 25, 2011 the permit worker experienced an electrical shock while plugging the plug of an MC4 Connector into the receptacle of an MC4 Connector: specifically, he was plugging one of the plugs on a harness into a receptacle at the end of a string. There were a number of factors which contributed to this incident. The area was extremely muddy and wet and it was raining at the time of the incident. The worker was seated on a plastic bucket and, although he was wearing rubber boots, his boots and the base of the bucket were immersed in a pool of water. The worker was wearing Kevlar gloves which were wet. The cables were abraded. The worker was sitting in close proximity to the steel structure of the racking system. The worker had incorrectly connected the second group of 9 modules in a row to the third group of 9 modules so that 18 modules were connected in series. The parties agree that if these factors had not been in existence, the worker would not have received a shock while connecting the MC4 Connector.

16. The theoretical voltage of 18 modules connected in series was calculated by an Electrical Engineer for the Ministry of Labour as 1098 volts. First Solar did a calculation

taking into account factors such as the abrasion of the cables and concluded that in the circumstances the string of 18 modules had a voltage of 540. The IBEW states that it does not matter: anything over 42.4 volts can create a shock which is potentially fatal.

17. The incident was reported to the Ministry of Labour and investigated by Inspector Clavijo. He made two orders: Gil & Sons was ordered to ensure that workers used rubber gloves that are adequate to protect against electrical shock and burn; First Solar was ordered to ensure that every employer and every employer working on the project complied with the Act and the regulations, and specifically that Gil & Sons complied with the order issued against it. The Inspector noted that both Gil & Sons and First Solar were in compliance at the time of the field visit.

18. First Solar did its own investigation of the incident and adopted a number of new procedures designed to increase the safety of workers performing the work: table markers were to be used under the tables (i.e. racks) to identify the harness locations before "plug and play" occurs; the harnesses and jumpers were to be physically examined for cuts and insulation damage by a trained installer before they were tie wrapped to the table rails; workers were to wear dry Class 00 rubber gloves with protectors when "plugging and playing"; two workers were to work on harness at a time to verify each other's work; if more than 9 modules were found connected in a series, workers were to bring it to the attention of their supervisor.

19. As noted, the Inspector also found that the work in question did not need to be done by a certified electrician or apprentice electrician, as section 182(2) of the Regulation applied. It is this conclusion which the IBEW challenges on this appeal. It remains the position of First Solar and the Director that the work need not be done by a certified electrician or apprentice electrician.

20. The IBEW notes that the Electrical Trade Bargaining Agency of the Electrical Contractors Association of Ontario, The International Brotherhood of Electrical Workers and The IBEW Construction Council of Ontario have entered into a Letter of Understanding with respect to "Solar Photovoltaic Electrical Generating Plants (Solar Farms)". It asserts that the Letter of Understanding provides that the work in question must be performed by a certified electrician or an apprentice electrician. Thus, it argues, this is work which it "already has". Nonetheless, the IBEW is not before the Board on a grievance alleging a breach of the collective agreement to which Gil & Sons is a party. Rather, the IBEW is before the Board on an appeal which raises a question of statutory interpretation of the Regulation. The IBEW acknowledges that whatever rights it may have as a result of the Letter of Understanding does not answer the question of statutory interpretation, and that the agreements of the collective bargaining parties should not influence the Board in the determination of the issue before it.

21. The position of the IBEW, more fully developed below, is that a "convenience receptacle" for the purposes of the Regulation is a receptacle of the sort that would normally be found in an office or home designed to receive a standard 2 prong or 3 prong plug (I will refer to this as a "standard receptacle"). There are a number of features of

standard receptacles which distinguish them from the receptacle on an MC4 Connector. First, the 2 or 3 prong plugs which they are designed to receive have 2 or 3 wires, compared to the single wire which runs to an MC4 Connector plug. The 2 wires on a 2 prong plug are a neutral and a live wire. The 2 blades on a 2 prong plug are of different sizes: the bigger blade is associated with the neutral wire. The different sizes of the blades mean that a 2 prong plug can only be inserted into the standard receptacle in one direction. The 3 blades on a 3 prong plug mean that it also can only by inserted into the standard receptacle in one direction. The 3 wires for a 3 prong plug are a neutral, a live and a ground. The ground wire goes to a prong which is longer than the others and therefore is the first to make a connection when inserted in the standard receptacle and the last to break the connection when removed, which is in itself a safety feature. On the receptacle side there are also differences. As previously discussed an MC4 receptacle has only one wire. A standard receptacle has 3 wires: a neutral, a live and a ground.

22. First Solar and the Director point out that unlike an MC4 plug, the blades on standard plugs are not encased in a housing. That is, it is possible to touch those blades: they are not finger safe. They also point out that unlike an MC4 Connector, the connection formed by a standard plug and receptacle: does not lock together; is not waterproof; and does not bear a warning not to unplug under load.

23. The amount and nature of the power carried by a standard receptacle also differs from an MC4 receptacle. A standard receptacle is designed to carry 120 volts of AC power; an MC4 receptacle is designed to carry 600 volts of DC power. For an equivalent voltage, DC power is more hazardous than AC power, provided that there is a load (i.e. current flowing). This means that there is greater hazard associated with disconnecting a DC connection. There may also be a hazard associated with connecting a DC connection if the circumstances are such that the person making the connection creates the load. This was the case during the incident on October 25, 2011. There is no suggestion that if reasonable procedures are followed, such as those adopted by First Solar following the incident, that a load will be created by the worker making the connection. That is, the act of connecting an MC4 Connector is not in and of itself hazardous.

24. First Solar notes that there are a large number of AC receptacles, including those designed to receive standard household stove plugs, which carry 220 volts and those which are designed to receive welder plugs, which carry 600 volts phase to phase and 347 volts phase to ground. Each of these receptacles looks different than a standard receptacle. A welding plug receptacle generally also includes a locking mechanism, as the plug is twisted when it is inserted.

Analysis and Decision

25. As noted, O. Reg. 213/91 contains the “Construction Projects” regulation of the Act. Sections 181 to 195.3 specifically address “Electrical Hazards”. Section 182 of the Regulation provides:

> **182.** (1) No worker shall connect, maintain or modify electrical equipment or installations unless,
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> (a) the worker is an electrician certified under the *Trades Qualification and Apprenticeship Act*; or
>
> (b) the worker is otherwise permitted to connect, maintain or modify electrical equipment or installations under the *Trades Qualification and Apprenticeship Act*, the *Apprenticeship and Certification Act, 1998* or the *Technical Standards and Safety Act, 2000*.
>
> (2) A worker who does not meet the requirements of clause (1)(a) or (b) may insert an attachment plug cap on the cord of electrical equipment or an electrical tool into, or remove it from, a convenience receptacle.

26. The IBEW accepts that an MC4 plug is "an attachment plug cap" within the meaning of the Regulation. It also agrees that an MC4 receptacle is a "receptacle", which is a term of the trade. It argues, however, that it is not a "convenience receptacle". The term is not defined by the Regulation. That term, the IBEW asserts, is restricted to a standard 120 volt receptacle described earlier in this decision. The IBEW advances in essence three arguments in support of this position.

27. First, the IBEW notes that what is at issue is an exemption to a general provision which prohibits the performance of electrical work by anyone other than a certified electrician or apprentice electrician. Exceptions should be narrowly construed.

28. Second, the IBEW argues that the proper meaning of the term "convenience receptacle" in the exception contained in section 182 can be gleaned from the predecessor to that section contained in O. Reg. 659/79, the original regulations promulgated under the Act in relation to Construction Projects. Section 100 of that regulation read:

> Except where the connection is made by inserting an attachment plug cap on the cord of the electrical equipment or tool into a convenience receptacle, only a worker who is an electrician certified under the *Apprenticeship and Tradesmen's Qualifications Act* or a worker who is similarly qualified by training and experience shall connect any electrical equipment or tool to a power source or disconnect any electrical equipment or tool from a power source.

The IBEW notes that the prohibition in the original regulation is differently worded than the current Regulation, but that the exception has the same wording. The effect of the exception in the original regulation was that a worker on a construction site who was not an electrician could plug a tool into a power source without waiting for an electrician: that was what plugging into a convenience receptacle meant. Since the same wording is used for the exception in the current Regulation, the IBEW argues that it must be interpreted in the same way.

29. Third, the IBEW argues that this limited exception is practical and consistent with the norms of the construction industry, in which workers other than electricians plug electrical tools in all the time in order to obtain AC power to operate those tools. By contrast an MC4 receptacle relates to DC power, which is inherently more dangerous than AC power, and at a voltage which is significantly higher than that provided by a standard receptacle. The greater danger associated with the use of an MC4 receptacle is reflected in the fact that the *Canadian Electrical Code* prescribes both a locking mechanism and a printed warning for an MC4 Connector. An MC4 connection is made not to obtain power so that a worker may perform other work; rather it is made as part of the process of making wiring connections to create a power generating device. That is inherently the work of an electrician.

30. I am not persuaded by these arguments for many of the reasons advanced by First Solar and the Director.

31. First, the exemption refers not to "electrical tools", but to "electrical equipment or tools". It is not, therefore, restricted to the types of power tools commonly used in the construction industry. There is no dispute that the modules, strings and arrays in question constitute electrical equipment.

32. Second, if the intention had been to restrict the exemption to receptacles related to a "power source" as appears to have been the case with the original regulation, it would have been easy to import the words "power source" from the wording of the original regulation. They were not. Reference to the original regulation, therefore, if anything supports the inference that the exemption in the current Regulation is meant to have broader application. Nor is there anything else in the current regulation which suggests that the direction in which the power is flowing is of any consequence. There is also nothing in the current Regulation which suggests that either the prohibition or the exemption are limited to power sources rather than the interconnecting of wiring to make a circuit.

33. Third, and in any event, it is not clear that the words "power source" in the original regulation have any bearing on the meaning to be given to the term "convenience receptacle". Convenience ordinarily connotes ease of use. A convenience receptacle is one that is designed to accept a plug cap without any further work in order to effect the connection. The hazards associated with such other work are thus avoided by the design of the plug and the receptacle themselves.

34. Fourth, it is not clear how the interpretation urged by the IBEW would advance the purposes of the Act: the promotion of health and safety. In this respect I note that the IBEW expressly states that it does not argue that the work is dangerous or hazardous and therefore only an electrician can do it; rather its argument relates only to the words of the Regulation.

35. The Board has in fact had occasion to interpret what the predecessor of what is now section 182 of the Regulation, albeit within the context of a jurisdictional dispute. In

Babcock & Wilcox Industries Ltd., [2004] OLRB Rep. Jan./Feb. 6, the work at issue involved the installation of stringers, described at paragraph 5 of the decision as "a length of insulated electrical wire with a plug at one end, and usually holding 10 to 12 light fixtures along the length of the fixture". The stringers were fabricated off site. The IBEW claimed the work of moving the stringers, connecting them to electrical receptacles or extension cords, and hanging them when needed. The Board addressed the IBEW's argument that safety and the application of the *Occupational Health and Safety Act* favoured the assignment of the work to it as follows (in relevant part):

> **24.** The IBEW made much of its contention that the Occupational Health and Safety Act and the Canadian Electrical Code, in their view, requires this work to be performed by a certified electrician. This factor is, I conclude, overstated. Section 181 of O. Reg. 231/91 [sic: O. Reg. 213/91] under the Occupational Health and Safety Act states:
>
> > **181.** (1) No worker other than an electrician certified under the Trades Qualification And Apprenticeship Act to do electrical work or a person with equivalent qualifications by training and experience shall connect, maintain or modify electrical equipment or installations.
> >
> > (2) Subsection (1) does not apply to work performed in compliance with section 183.
> >
> > (3) A worker without the qualifications described in subsection (1) may insert an attachment plug cap on the cord of electrical equipment or tool into, or remove it from, a convenience receptacle.
>
> Clearly, section 181(3) covers this work and a certified electrician is not required to perform the work in dispute.
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> **25.** That is not to say that electrical equipment carrying a live charge does not raise safety concerns. As anyone who has ever touched a "live wire" in his or her own home knows, this is a matter that requires some care. However, in this case, I conclude that the specialized skill of an electrician is not required to perform the work safely. Stringers are, after all, sealed units. Workers should not be handling any uninsulated wire, nor does the work require them to do so. Connections are made with a plug into a receptacle, not by joining wires together. While care must be taken in the handling of any electrical wire to ensure it does not split or the insulation is not scraped off, that level of knowledge and care would be available to any employee who works with power tools. If the boilermakers plug in fans with sufficient care, they can presumably plug in stringers with sufficient care.

I note that before me the IBEW seeks to distinguish *Babcock & Wilcox Industries Ltd.* on the basis that it dealt with plugging the stringers into a power source whereas the present case involves the interconnecting of wiring to make a circuit. For the reasons already stated, in my view this is a distinction without a difference.

36. In this case, the MC4 Connector consists of a uniquely designed MC4 plug which can only fit into the uniquely designed MC4 receptacle. No special expertise is required in order to effect the connection. It is in fact safer than plugging a plug into a standard receptacle in that: both the MC4 plug and the MC4 receptacle are finger safe; a worker is alerted to whether the connection has been effected by the presence or absence of an audible clicking noise; once the connection is effected it is locked; once the connection is effected it may be immersed in water; and the MC4 Connector bears a printed warning that it should not be disconnected while under load. The specialized skill of an electrician is not required to perform the work safely.

37. Fifth, the interpretation urged by the IBEW would give rise to anomalous if not absurd results. There are a number of different receptacles which provide power to electrical equipment. I accept the argument of the IBEW that there is no evidence before me that a certified electrician or apprentice electrician is (or is not) required to connect a stove plug to a 220 volt stove receptacle or a welder plug to a 347/600 volt welder receptacle. But even leaving these examples aside (and the question of which party bore the burden of proof as to who may perform the work), I am, I believe, entitled to take notice of the fact that a notebook computer is a piece of electrical equipment that may be used on a construction project. The IBEW's interpretation would mean that anyone could plug the power adaptor of such a computer into a standard receptacle, but only an electrician could plug the other end of the adaptor into the computer itself.

38. For all of the foregoing reasons, the appeal is denied.

"Ian Anderson"
for the Board