

## SUMMARY REPORT

COWIE-MORRISON PROPERTY

Nahwegezhic Township, Ontario, Canada



ESSAR STEEL ALGOMA INC.  
105 West Street,  
Sault Ste. Marie, Ontario, Canada  
P6A 7B4

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Prepared By:

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## 1.0 HIGHLIGHTS

- Essar's Cowie-Morrison Property covers a ~963 ha area underlain by most of the Goulais River Iron Range.
- Located ~90 km north-northeast of Sault Ste. Marie by road, following the Trans Canada Hwy. and a network of secondary roads.
- Contains four iron orebodies (Gut Lake North, Gut Lake, Ella Lake, and Morrison Lake) that have not been mined and have the potential to host economic amounts of iron.
- The open pit tonnage at Morrison Lake is 9,573,000 tons at a grade of 20.4 % magnetic iron (Canadian Bechtel Ltd., 1966).
- In 1968, reserves from the entire Goulais River Iron Range (including Essar's present Property) were sufficient to produce 1 million tons of pellets per year for about 30 years (Shklanka, 1968).
- The Property has not been explored for any other commodity such as gold that is known to be associated with iron formations.

## 2.0 LOCATION AND TENURE

The Cowie-Morrison Property is located approximately 65 km north-northeast of Sault Ste. Marie, northeastern Ontario, in Nahwegezhic Twp. The approximate center of the Property in UTM coordinates is: 285525 E, 5212739 N, Zone 17, NAD 83 and in geographic coordinates: 83°49'22.50"W and 47°2'0.11" N.

The Cowie-Morrison Property consists of one freehold patent totaling 963.09 ha (Table 2-1, Figure 2-1). Essar holds 100% of both surface and mining rights on the patent. The patent has no expiry date and the only obligation is to pay land tax on it.

*Table 2-1 Essar's tenure for the Cowie-Morrison Property*

MNDMF patent number	Land Registry Pin No.	MPAC Roll Number	Township	Area (ha)	Name
PARCEL A	31273-0005 LT	579925900000800	McMurray	963.087	Cowie-Morrison

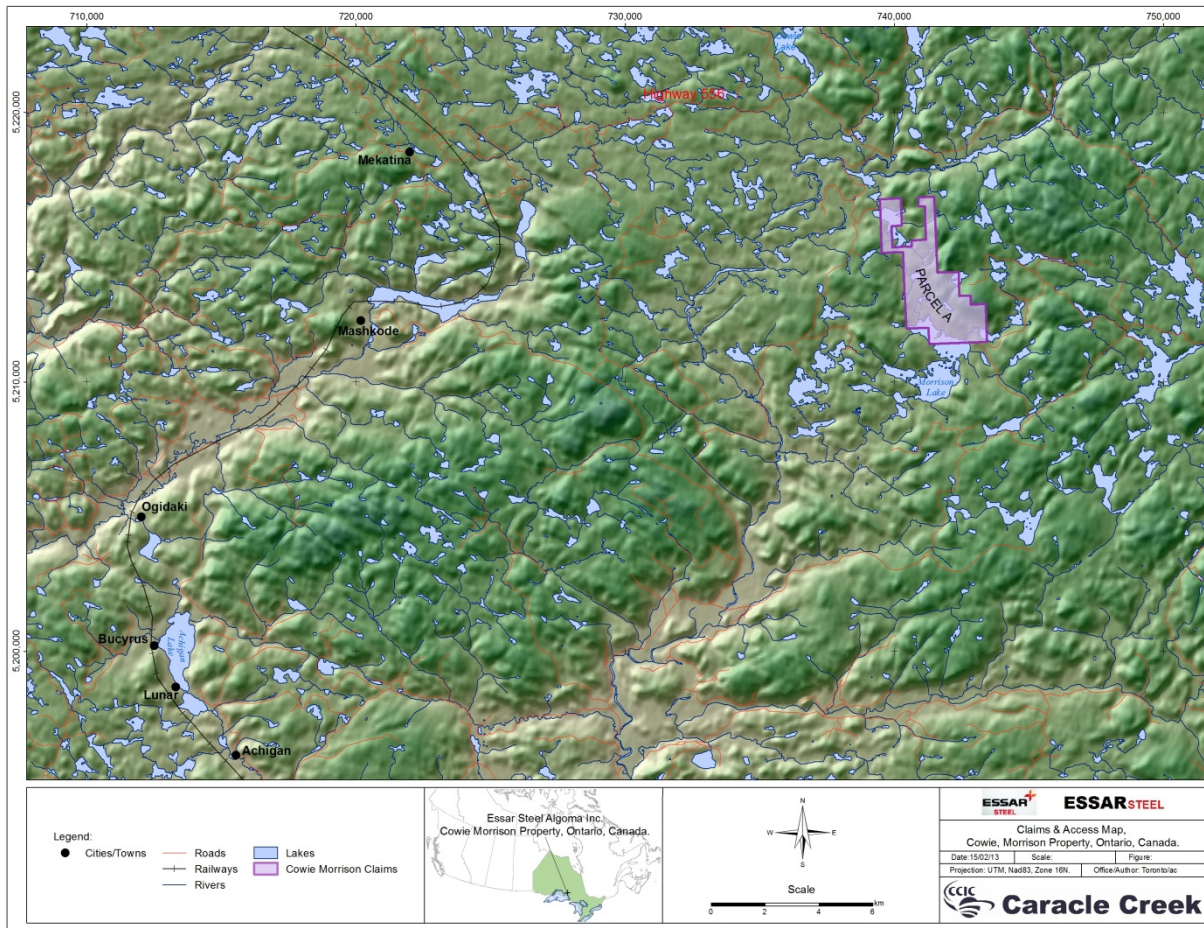


Figure 2-1 Tenure map for the Cowie-Morrison Property

### 3.0 ACCESS AND INFRASTRUCTURE

The Cowie-Morrison Property can be accessed by road following the Trans Canada Hwy. north from Sault Ste. Marie for 18 km, then turning northeast onto Road 556 until Glendale (~27 km), turning north to Searchmont (~5 km), turning northeast from Searchmont onto Whitman Dam Road. The Cowie Lake is located approximately 46 km north-northeast of Searchmont by road and the western boundary of the Property is approximately 1 km east of the road. The Property can also be accessed through Mekatina, following the Trans Canada Hwy. from Sault Ste. Marie for ~53 km then turning right and following a network of smaller roads for ~80 km to the east. The closest railway track is approximately 10 km west of the Property. The nearest airport to the Property is in Sault Ste. Marie.



The town of Sault Ste. Marie has restaurants, hotels, hospital, and Ontario Provincial Police Station. The town of Sault Ste. Marie could supply most of the needs of an exploration program at Cowie-Morrison. Sault Ste. Marie has an urban population of 67,646 people in 2011 (Statistics Canada: <http://www.citypopulation.de/php/canada-ua-ontario.php?cityid=739>).

## 4.0 EXPLORATION HISTORY

Most of the exploration on the Cowie-Morrison Property was completed by Algoma and it is not public information. In the past the Cowie-Morrison Property included McPhail, Cowie Lake, Gut Lake (Gut Lake North, Gut Lake and Ella Lake) and Morrison Lake orebodies, but the patent held by Essar at the present time includes only the Gut Lake and Morrison Lake orebodies. Table 4-1 summarizes the exploration history on the Cowie-Morrison Property.

*Table 4-1 Summary of exploration on the Cowie-Morrison Property*

Year	Company	Source of data	Type of work	Results
1920	Algoma?	Assessment files: 41O04SW0021, 41O04SW0023	survey and sampling	large lense: 5 million tons of ore/100 ft of depth, width varies from 20 to 230 ft, ~30% iron, low grade magnetite
1941	Algoma	internal report	13 drill holes totaling 7,398 ft on Gut Lake section	
1941	Algoma	internal report	50 drill holes totaling 22,466 ft on Morrison lake section, drill holes 145 to 157	
1963	Algoma	internal report	Preliminary engineering study and cost estimates (Arthur G. McKee & Comp. Canada Ltd.)	
1966	Algoma	internal report	8 drill holes on Gut Lake section and resource estimate	2,232,000 g/t Fe in Area A and 2,946,000 g/t Fe in Area B
1966	Algoma	internal report	Engineering studies and cost estimate (Canadian Bechtel Ltd.)	Morrison Lake open pit ore reserves estimated at 9,573,000 long tons at 20.4% magnetic Fe
1975	HBOG Mining Ltd.	Assessment file: 20006965	Airborne EM survey	looking for bedrock conductors, identified IF

## 5.0 GEOLOGY

The Cowie-Morrison Property is located in the Batchawana Greenstone Belt of the Abitibi Subprovince (Jackson and Fyon, 1991). The Batchawana Greenstone Belt is subdivided into the Griffin, Dismal and Wart assemblages.

The Cowie-Morrison Property is underlain by rocks of the Dismal assemblage (2711 to 2698 Ma), which consist of mafic volcanic rocks with dominantly tholeiitic affinity in the northwestern, northern and eastern part of the assemblage, felsic and intermediate volcanic rocks with calc-alkalic affinity in the southeastern part, minor sediments, and oxide and minor sulphide facies iron formation that is interlayered with both mafic and felsic volcanic rocks (Figure 5-1). The iron formation marks the change from tholeiitic mafic volcanic to calc-alkalic intermediate and felsic volcanic environment (Grunsky, 1980).

Regional foliation has a northwest strike and the grade of metamorphism ranges from greenschist to amphibolite facies.

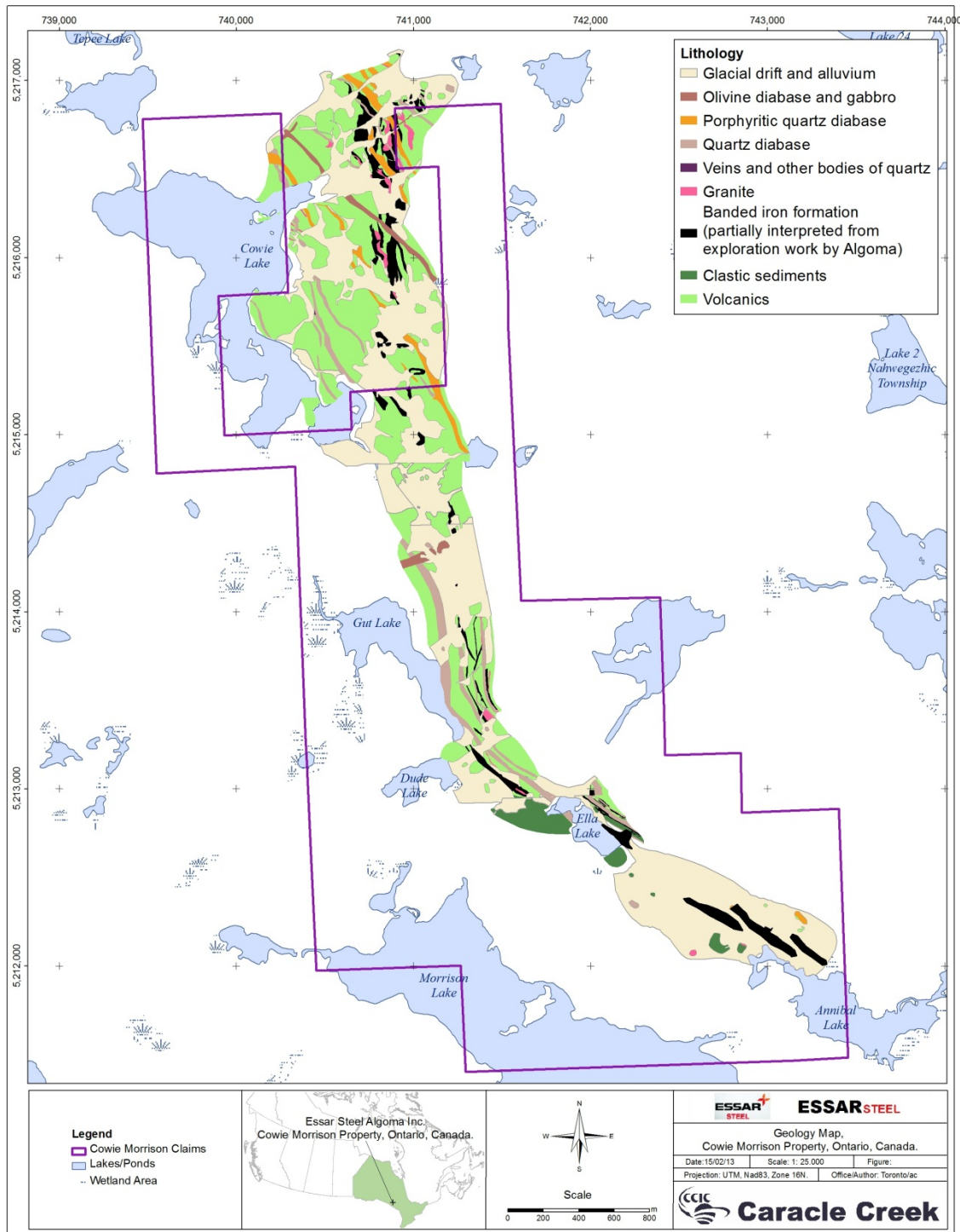


Figure 5-1 Local geology map for the Cowie-Morrison Property (modified from Moore and Armstrong, 1946 and Algoma Ore Properties internal files from 1956)

## **6.0 MINERALIZATION**

Essar's Cowie-Morrison Property covers the southern half of the Goulais River Iron Range, which is nearly 6 km long, varies in thickness from 10 cm to 200 m, extends to more than 300 m in depth and has a north-northwesterly trend (Grunsky, 1980). The major iron orebodies in the Goulais River Iron Range are McPhail, Cowie Lake, Gut Lake and Morrison Lake sections, from north to south (Figure 5-1).

According to an engineering study completed by Canadian Bechtel Ltd., on behalf of Algoma, in 1966, the open pit tonnage at Morrison Lake is 9,573,000 tons at a grade of 20.4 % magnetic iron.

The majority of the Goulais River Iron Range consists of Algoma-type oxide facies iron formation composed of magnetite-chert beds varying from 2 mm to 1 cm in thickness (Grunsky, 1980, Moore and Armstrong, 1946). Minor jasper, amphibole, hematite and pyrite are also present. The total iron content of the minable material ranges between 25 and 40%, with an average from 30 to 32%.

## **7.0 ADJACENT PROPERTIES**

Adjacent claims and dispositions are held by individuals and there is no public information on exploration activities, but the dispositions east of Cowie Lake host the Cowie Lake section and the claims north of the Essar's Property host the McPhail section of the Goulais River Iron Range. According to Shklanka (1968), reserves from the whole Goulais River prospect were sufficient to produce 1 million tons of pellets per year for about 30 years.

The three additional iron occurrences in the area include the McClintock occurrence located ~6 km north-northeast of the Property, the Butter Tin occurrence located ~9.5 km north-northwest of the Property, and the Central Goulais occurrence located ~13 km northwest of the Property (MNDMF Mineral Deposit Inventory).

The Butter Tin occurrence consists of banded iron formation of narrow stringers to width up to 30 m (MNDMF Mineral Deposit Inventory). The iron content is up to 64.65%, contained in magnetite and jasper. The total length of the iron formation is not available.

The Central Goulais occurrence consists of numerous narrow, discontinuous northwest trending bands of iron formation in a 7.2 km long and 5.6 km wide area. Two main bands can be traced to ~1829 m. Channel samples returned around 33% Fe and 60% SiO<sub>2</sub>.

The McClintock occurrence consists of small masses of hematite in pegmatitic granites in felsic tuffs (MNDFM Mineral Deposit Inventory).

Occurrences of other commodities in the area include Private Lake-Northwest occurrence (2.5 km to west; Cu), Teepee Lake occurrence (3 km to north; Cu, Au, Pb, Ag), Brennan occurrence (4 km to north; Cu, Pb, Zn, Ag), Hanes Lake West occurrence (7.5 km to northwest; Cu, Zn, Pb, Ag), Hanes Lake North occurrence (8 km to northwest; Au), and Loggers Lake-Northwest occurrence (9 km to west; Cu). These occurrences exist in the form of banded sulphide iron formation and volcanic exhalative lenses interbedded with metavolcanic rocks.

## 8.0 REFERENCES

- Arthur G. McKee & Company of Canada Ltd. (1963): Preliminary engineering study and cost estimates covering crushing, concentrating, pelletizing and handling of Goulais Iron Property ores for Algoma Ore Properties Division of the Algoma Steel Corporation Ltd., 4p.
- Canadian Bechtel Ltd. (1966): Engineering studies and cost estimate, Goulais River Project, Cowie Lake, Ontario; prepared for the Algoma Ore Properties, Division of Algoma Steel Corporation, 14p.
- Grunsky, E.C. (1980): Geology of the Cowie Lake Area, District of Algoma; Ontario Geological Survey Report 192, 67p. Accompanied by Map 2426, scale 1:31 680 (1 inch to 1/2 mile).
- Jackson and Fyon (1980): The Western Abitibi Subprovince, Chapter 11, in Geology of Ontario, Ontario Geological Survey, Special Volume 4, Part 1, p. 405-482.
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Shklanka, R. (1968): Iron Deposits of Ontario; Ontario Department of Mines, Mineral Resources Circular No. 11, 489p.